

SOUTHERN POWER AND INDUSTRY

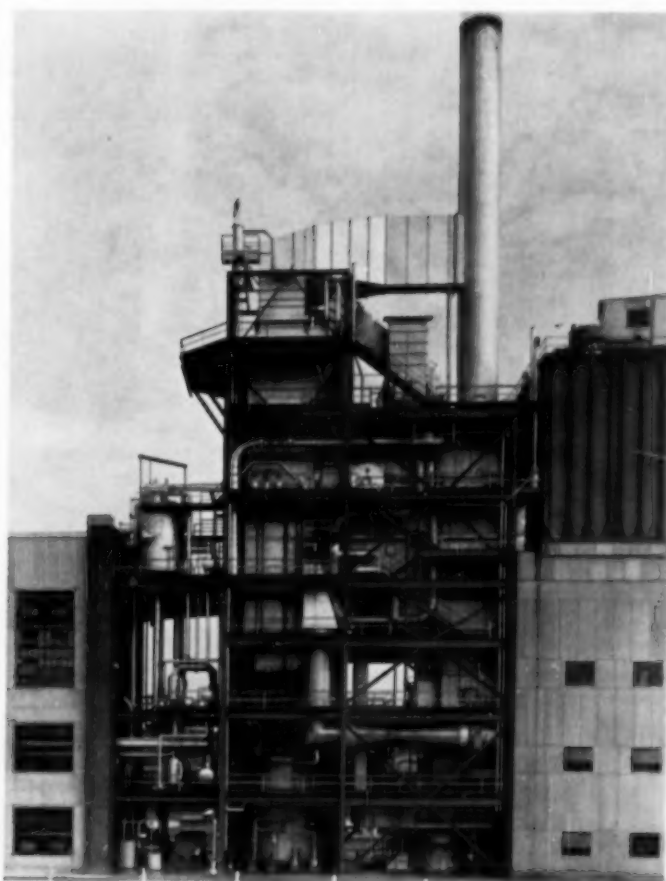
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JANUARY, 1957



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Modern Industrial Power Plant



GREENWOOD MILLS—A modern, efficient and serviceable industrial power plant in South Carolina . . . pressurized furnace . . . cyclone firing system . . . pneumatic combustion control . . . minimum of operators . . . has more than met design requirements . . . efficiency around 90% or better — SEE PAGE 42.

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Allis-Chalmers Pumps Meet Power Plant Requirements



Continuous Condenser Service at Detroit Edison's River Rouge Plant

At River Rouge Station, these Allis-Chalmers 84 by 60-inch circulating pumps, driven by 500-hp motors, deliver 73,000 gpm to the A-C condenser.

They play an important part in assuring service continuity at this station. An accurately cast impeller, hand finished and dynamically balanced, assures smooth operation. Other features, including a rigid whip-free shaft, and tube-protected shaft and rubber bearings lubricated with filtered water, have made A-C circulating pumps popular throughout the power industry.

Many customers use Allis-Chalmers test facilities to properly design their intake structures.

You Get **MORE** than a Pump . . .
When You Specify Allis-Chalmers

You can take advantage of Allis-Chalmers wide experience in supplying pumps to all industries. You are assured of modern design, heavy-duty construction and correct application aid — all

adding up to many years of dependable service.

Allis-Chalmers is the only company that can offer you "One-Source" responsibility, with a complete unit — pump, motor and control — all built to work together. For "MORE" information about Allis-Chalmers pumps, call your local A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-5216

ALLIS-CHALMERS

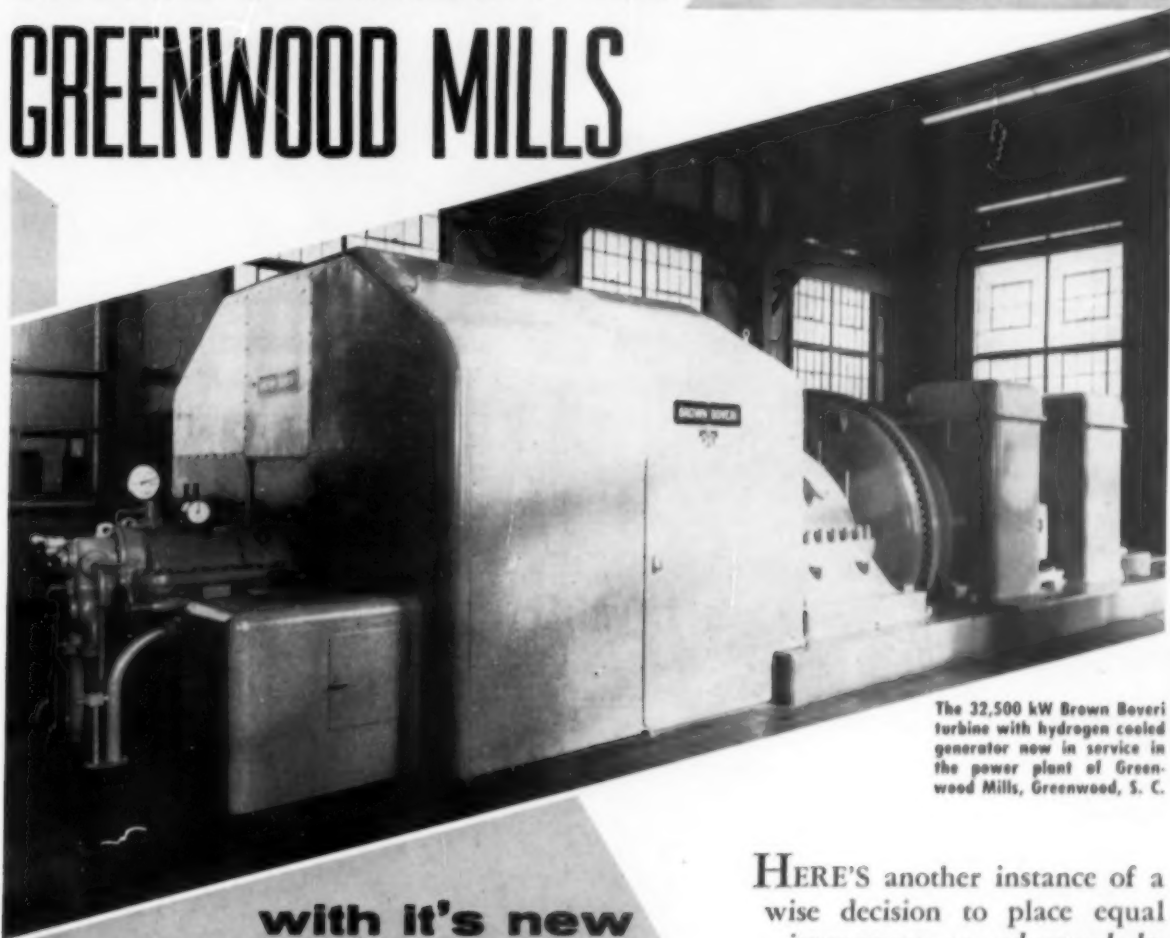


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Volume 75

Number 1

MORE POWER FOR GREENWOOD MILLS



The 32,500 kW Brown Boveri turbine with hydrogen cooled generator now in service in the power plant of Greenwood Mills, Greenwood, S. C.

with it's new

BROWN BOVERI

hydrogen cooled

TURBO-GENERATOR

HERE'S another instance of a wise decision to place equal importance on *advanced design, thorough dependability, long life, high operating efficiencies, low maintenance and substantial dollar savings* as the determining factors in the purchase of turbo-generating sets.

More Power
to
Greenwood
Mills!

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SOUTHERN POWER AND INDUSTRY

Vol. 75
No. 1

JANUARY, 1957



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SOUTHERN POWER & INDUSTRY for JANUARY, 1957

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

January 1, 1957

- ◆ **GREENWOOD MILLS** in Greenwood, South Carolina, has a new modern, efficient and serviceable industrial power plant. In this issue (See "New Plant Rather Than Addition") W. L. Bross, Chief Engineer of Greenwood Mills summarizes the design and operational highlights.

Features include: pressurized furnace, cyclone firing system, pneumatic combustion control, and minimum of operators. Plant has more than met design requirements. Boiler efficiency is around 90% or better; and the net plant heat rate of around 11,500 Btu will undoubtedly be improved.

- ◆ **FLUID TRANSFER**—In processing plants raw materials (liquids) stored in tanks have to be moved to processing units (filtering, blending, etc.) or to finished material storage tanks and then to packaging units, or directly from treating or processing unit to packaging equipment.

A new coupling technique can replace the conventional fixed piping lines (with built-in valve manifolds) where the opening or closing of appropriate valves sets up the desired fluid transfer lines.

The quick-connect hose coupling by Titeflex, Inc., is claimed to improve operation, increase safety and reduce piping installation cost. They can be dependably used for high pressure, high-capacity liquid lines. Fixed pipe lines are run to a central point so that a snap-on flexible hose link can be rapidly shifted from one line to another, resulting in a switchboard-like arrangement of fixed piping.

- ◆ **THERE IS NO CORNER ON IDEAS** and smaller firms have just as much access to them as their bigger rivals. George Jagers, president of the Fort Worth Steel & Machinery Company, Fort Worth, Texas, emphasized this point at the recent Sea Island, Georgia, joint meeting of the Multiple V-Belt Drive and Mechanical Power Transmission Association meeting. He said that research holds equal opportunity for all companies, and there is no area in which the advantage clearly lies with either the small or large company.

The smaller company may enjoy a decided advantage. In the bigger firm, the man with an inspired idea may have to wait weeks or possibly months for various levels of authority to consider his idea, and then many more months before an agreement can be reached for a plan of action. In the smaller firm, the idea man may score a clean sweep over all competitors by swiftly recognizing the merits of a new idea and immediately placing in motion the necessary plans to give it life.

- ◆ **ZIPPER-STYLE plastic tubing**—Zippertubing—will reduce time and labor costs in the lacing and tying operation of electrical harness assemblies. Applications in addition to the primary use as a substitute method for lacing and other applications include

ALLEN-BRADLEY A-C CONTACTORS



2 pole—Size 00
10 amperes



3 pole—Size 1
25 amperes



3 pole—Size 2
50 amperes



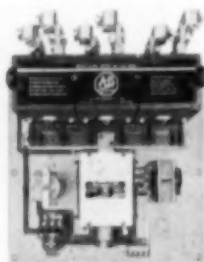
3 pole—Size 3
100 amperes



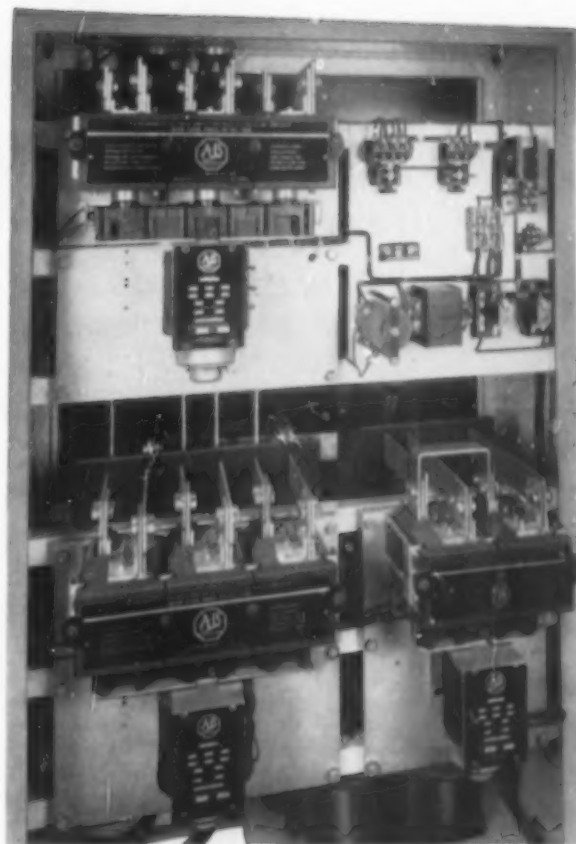
3 pole—Size 4
150 amperes



3 pole—Size 5
300 amperes



3 pole—Sizes 6 & 7
600 & 900 amperes contactors



250 Hp, Bulletin 746 automatic autotransformer showing Allen-Bradley Size 7 contactors

A-C and D-C CONTACTORS 10 to 900 Amperes with Double Break, Silver Alloy Contacts

The only complete line of solenoid contactors on the market. Allen-Bradley offers nine sizes . . . from Size 00 (10 amperes) to Size 7 (900 amperes), one to four poles.

There is no contact maintenance . . . no pins, pivots, or bearings to give trouble. Just one moving part—the simple solenoid plunger. Operating characteristics are consistent for all nine sizes.

Enclosures can be supplied for general-purpose, watertight, dust-tight, and explosion-proof service.

Allen-Bradley controls are an added sales asset to any machine. May we send you our catalog?

Allen-Bradley Co., 1328 S. Second St., Milwaukee 4, Wis.
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ALLEN-BRADLEY SOLENOID MOTOR CONTROL

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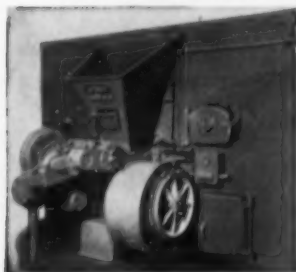
CHOOSE STOKER FIRING FOR ECONOMY AND SATISFACTION

Coal, Burned With a **DETROIT STOKER**
Offers Many Advantages, Proven By
Thousands of Installations

- Assured Fuel Supply
- Provides Steam At Lowest Cost
- Dependable—Noted For High Availability
- Maintenance Expense Low
- Requires Little Power For Operation

One of these Detroit Underfeed or Spreader Stokers will save you money—they are backed by over a half century of experience.

DETROIT UNISTOKER



Plunger feed, side-cleaning stoker is available in various sizes for 125 to 250 horsepower boilers. Full-housed blower either motor or steam turbine driven, mounted at stoker front. Adjustable Feed provides for either manual or automatic coal feed control.

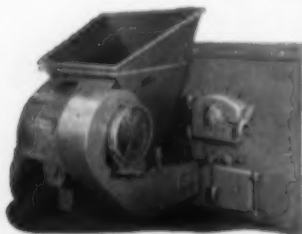
DETROIT DOUBLE RETORT STOKER



A multiple retort stoker having two retorts, with the side-cleaning feature requiring no basement. Now available with Detroit Adjustable Feed Coal Feed Control. For medium sized boilers.

DETROIT LOSTOKER

Has Detroit Adjustable Feed (Coal Feed Control).



A complete firing unit. Compact—single retort—mechanically driven—plunger feed—side-cleaning design. Many sizes and capacities for various types of boilers. Simple, accessible, dependable. A great coal saver.

DETROIT ROTOSTOKER



Spreader stoker with **OVER-THROW ROTORS** that distribute the fuel uniformly in the furnace. Fine particles burned in suspension and coarse coal, burned on the grate. Four types of grates are available. RotoStokers burn successfully an extremely wide range of fuels without any special preparation. In combination with coal, RotoStokers also successfully burn wood and other refuse.

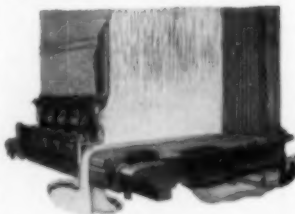
DETROIT ROTOSTOKER TYPE C-C (Continuous Cleaning)



An important addition to the comprehensive "Detroit" line of spreader stokers. Readily applied to small and medium size steam generators approximately 5,000 to 75,000 pounds of steam per hour. The continuous cleaning grates automatically discharge the ash at the front for easy removal. No basement needed.

DETROIT ROTOGRADE STOKER

Spreader stoker with **FORWARD MOVING GRATES** for medium and large boilers up to approximately 400,000 pounds of steam per hour. Screenings or crushed run-of-mine coal used without grinding or pulverizing. Successfully burns a wide range of fuels, including lower grades of Bituminous Coal and Lignites . . . with preheated air if desired. Higher burning rates for longer periods with low excess air and without slagging or clinkering difficulties. Combustible in ash is unusually low.



DETROIT STOKER COMPANY

GENERAL MOTORS BLDG., DETROIT 2, MICH.

District Offices in Principal Cities • Works at Monroe, Mich.

INVESTIGATE DETROIT STOKERS — IT'S THE ROAD TO ECONOMY AND SATISFACTION

Facts and trends (continued from page 4)

wiring ducts, wire marking (in short lengths) and as a replaceable cable jacket to protect expensive custom cables from abrasive wear. Zippertubing is produced by W. A. Plummer Mfg. Co., 752 S. San Pedro St., Los Angeles, Calif.

The zipper pull-tab is detachable, and the tubing may be "un-zipped" and re-used, or permanently sealed with a sealer. When sealed, Zippertubing will withstand a linear strength-test of 30 lb/in.

- ◆ **THROW-AWAY TOOLS** will shortly reach the total of 40% of all single-point tools used in metalworking and 60% of all single-point tools in all plants now using or already planning to use these tools. **Reasons:** maintenance of extensive and costly tool grinding facilities becomes less necessary; operators skilled in tool grinding are getting harder to find and costly to train; throw-away tools require no elaborate setting up on machines, reducing machine downtime for tool changes.

Industry is even more interested in adapting the throw-away principle on a broad scale to milling cutters and other more complex tools, such as boring tools, in a desire to eliminate grinding which is more complex and costly on milling and multi-diameter cutters than on single point tools.

- ◆ **LIQUID COAL** will soon be flowing thru the 108 mile, 10 inch pipeline which extends from the Pittsburgh Consolidation Coal Co. mines near Cadiz to The Cleveland Electric Illumination Co.'s Eastlake Steam Power Plant east of Cleveland, Ohio, a \$12,000,000 project requiring six years of research.

The coal will be pulverized as it comes from the mine, mixed with water and pumped thru the line to its destination where it will be dried and processed. The pipeline will supply over a million tons of coal a year, or 3,200 tons a day, to the generating plant—80% of its total fuel requirement.

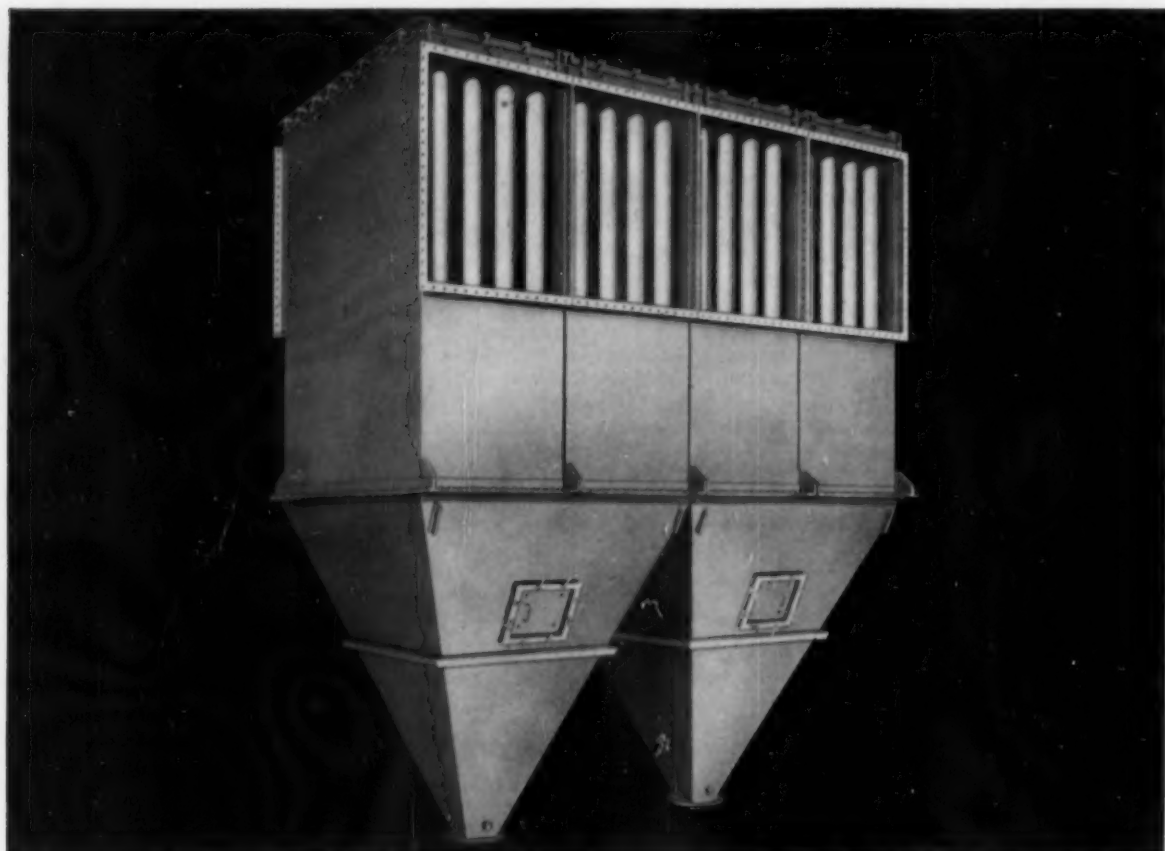
- ◆ **LIQUID SODIUM PUMP**—One of the largest liquid sodium pumps in the world will be used as a primary cooling pump for one of the nation's first full-scale commercial power plants using nuclear fuel.

Pump, built by Byron Jackson Pumps, Inc., is approximately 32 ft high with a 6 ft diameter. Rated at 1000 hp, it will pump liquid sodium at a temperature of 1000 F and deliver 11,800 gpm against a total dynamic head of 310 ft. It will be powered by a 900 rpm vertical, totally enclosed, forced ventilated wound rotor induction motor with speed variation from 100% to 20%.

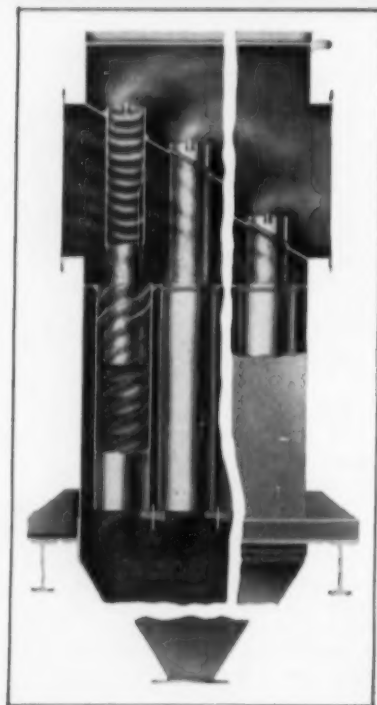
- ◆ **PLANT MAINTENANCE SHOW**, January 28 to 31 in Cleveland, Ohio, will have more than 400 companies exhibiting and the exhibit area will top the 100,000 sq ft mark. Theme for the 1957 Eighth Plant Maintenance & Engineering Conference is "Good Maintenance or Bad—The Difference Is Profit."

Separate industry discussion sessions include metalworking, chemical, pulp & paper, petroleum, food processing, and textiles; other sessions cover labor, materials handling, lubrication, sanitation, electrical, welding, costs, standards, painting and training. Advance registration cards and hotel information may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

Control fly ash with job-fitted



Series 342 Precipitator



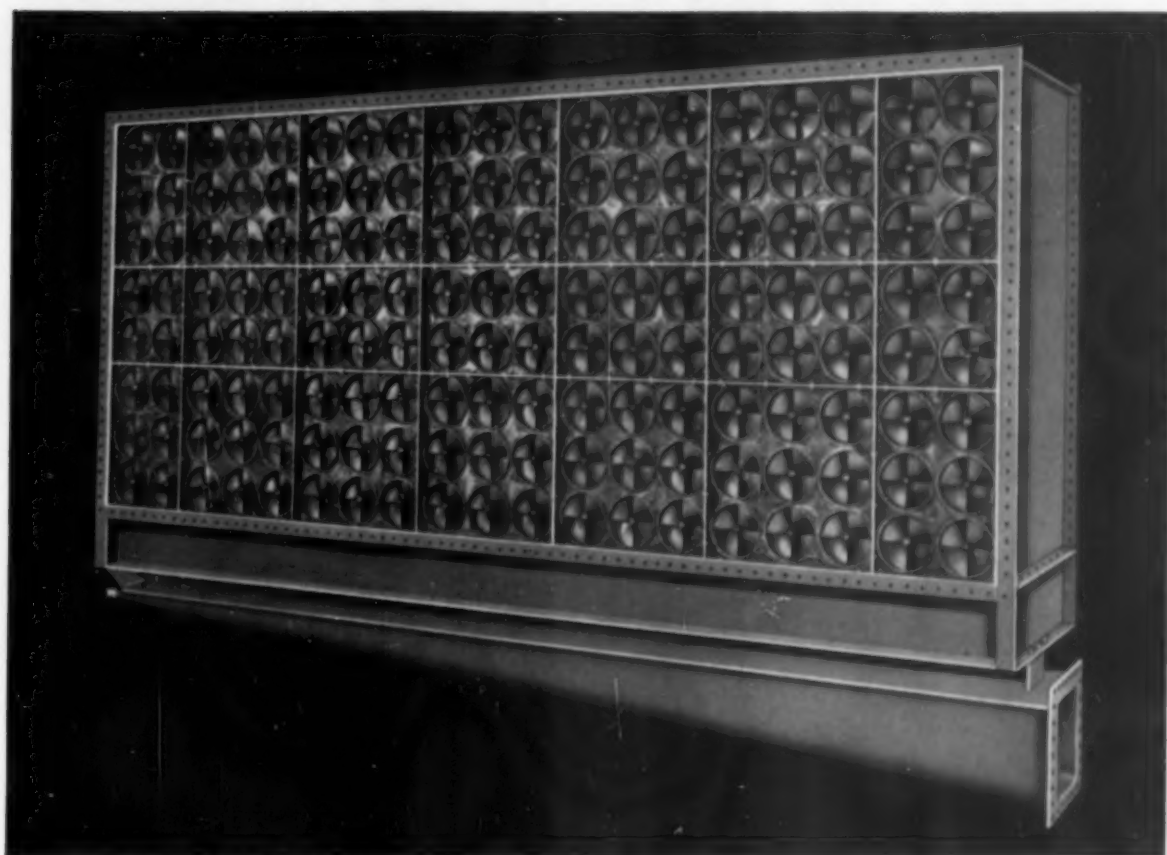
COMPACT DUST COLLECTOR — Series 342 Precipitator meets industry's need for a simple, compact, economical, all-purpose, mechanical-type dust collector. With the growing value of fly ash as a salable by-product, adequate, efficient collection is becoming increasingly important.

Easy to install because of its sectionalized construction, the Series 342 Precipitator has proved effective in controlling dust discharge to the atmosphere in a large percentage of industrial plants. The reason: since each tube assembly is basically an individual cyclone or centrifugal dust collector, the multi-tube Series 342 will deliver an over-all performance comparable to the high efficiency obtained by a single, small-diameter cyclone.

Furthermore, American Blower Series 342 Precipitator features welded-steel construction and removable tubes, is available in a variety of sizes to meet specific job requirements on either new or existing installations.

Dust-laden air or gas enters inlet plenum; gravity and centrifugal action force dust downward, adjacent to tube wall; dust is skimmed into gas-tight receptacle; cleaned air or gas moves upward through outlet tubes to outlet plenum.

American Blower precipitators



Series 361 Fly Ash Precipitator

FOR LARGE PUBLIC UTILITIES — Series 361 Fly Ash Precipitator offers maximum collection efficiency over entire operating range, occupies minimum space, and gives reliable performance, trouble-free operation.

What's more, the secondary separating system of the Series 361 makes it relatively more efficient at reduced loads when fly ash is finer and more difficult to remove. Then, too, ability to vary number and arrangement of individual cells makes it easy to tailor unit to the particular job.

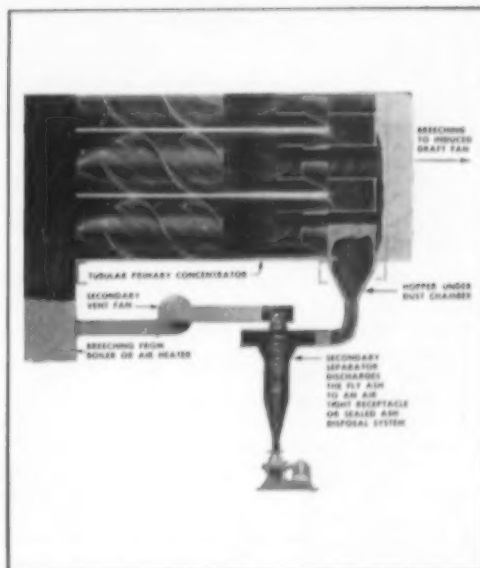
Whatever your dust-collection problem, it will pay you to talk to an American Blower engineer. His knowledge of the application of precipitators and dust collectors can prove invaluable to you. Call your nearest branch, or write: American Blower Corporation, Detroit 32, Michigan. In Canada: Canadian Sirocco products.

AMERICAN BLOWER

Division of **AMERICAN-Standard**



SOUTHERN POWER & INDUSTRY for JANUARY, 1957



Secondary system results in velocity-efficiency characteristics which automatically maintain maximum efficiency over entire boiler load or operating range. Properly installed and operated, unit's collection efficiency is from 85% to 90%.

For more information, use Reply Card—Page 17

NEWS for the South and Southwest



Huge Municipal Steam-Electric Plant for Memphis, Tennessee

Three steam-electric turbo-generator units, each with a nameplate rating of 250,000 kw, will eventually provide the Memphis area with a total net capability of 812,500 kw. The projected municipal steam-electric plant to be built by the City of Memphis is the largest single project of its kind ever undertaken by a community.

The new plant (see photo) will be located at Ensley Plantation on McKeller Lake near the new harbor and industrial development area. First unit is expected to be in operation by the end of 1958. To finance the undertaking the City of Memphis will issue approximately \$154 mil-

lion worth of tax exempt, electric revenue bonds. The bonds are to be repaid within 35 years from the city's Electric Division revenues, which are expected to provide an over-all debt service coverage ample to protect the huge investment.

Estimates indicate that the plant will enable Memphis to produce public power at the same rate level as the Tennessee Valley Authority, without subsidy in the form of direct or indirect taxation.

Current cost of power purchased by Memphis from the TVA is about 4 mills per kilowatt hour. But, due to rising fuel, labor and materials costs, this TVA price will likely

increase to an estimated 4.3 to 4.4 mills per kilowatt hour by 1962. Cost to Memphis of its own electric energy is expected to be at this same figure in 1962.

Cooperation between the City of Memphis and TVA will continue through an Interchange Agreement. After the Memphis contract for purchase of power from TVA expires in mid-1958, this agreement will enable an exchange of power so that whenever Memphis or the TVA can supply it more cheaply, the other will have access to it. Moreover, TVA has assured the municipality that it will take care of the Memphis area's power needs in the event of an interval between the expiration of the present contract with TVA and the adequate operation of the new Memphis power plant.

Expansion of Power Demands

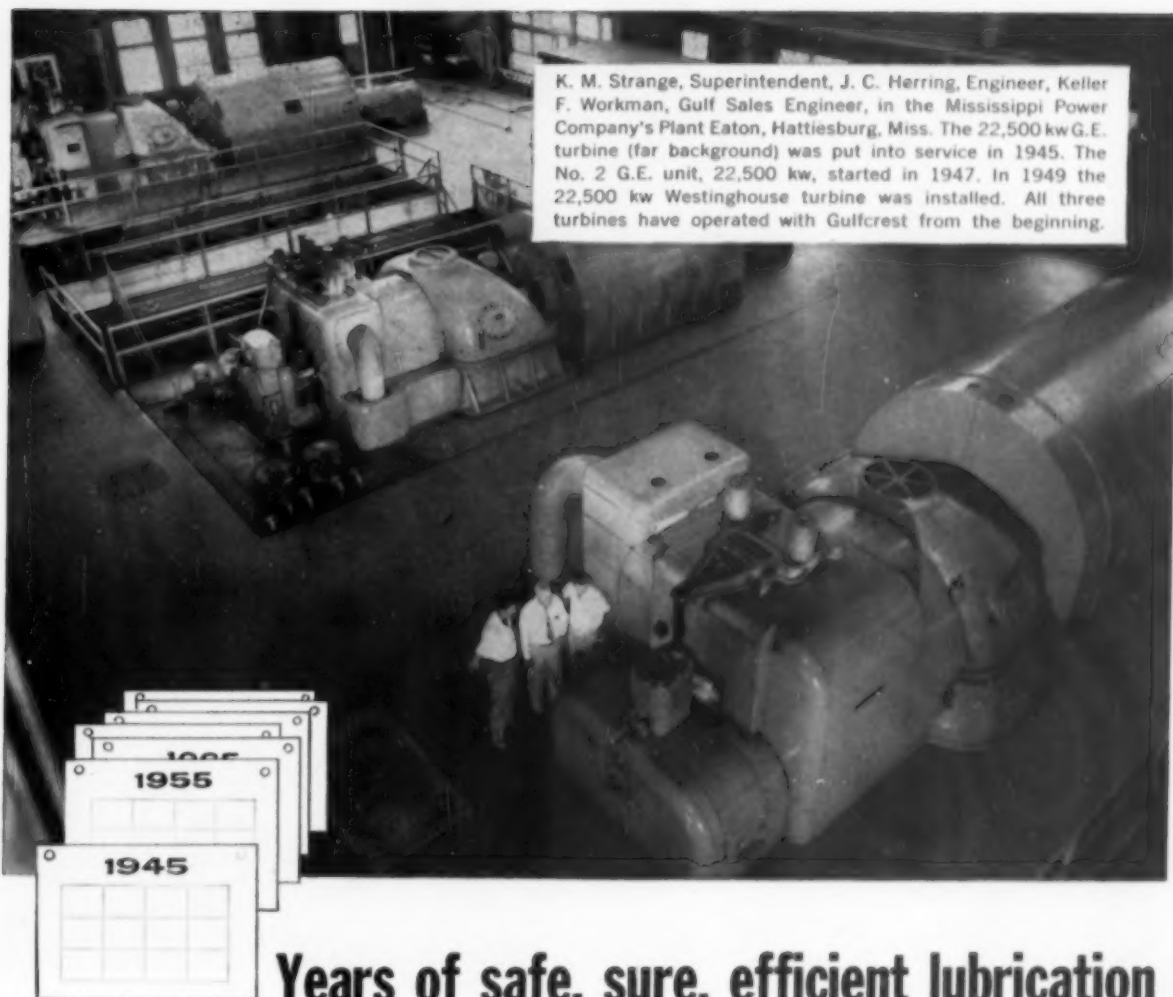
Actually, so rapidly-growing are the power requirements of the Memphis area that Mayor Orgill dramatizes them this way: Every 24 hours for the next ten years, the City of Memphis will need to add approximately 1,580,000 kilowatt hours to its yearly electrical energy output. And, he points out, to provide the additional power-producing facilities, an average investment of about \$107,000 a day for the next 3,337 days will be required.

The expansion of the Memphis area, from the standpoint of both total population and new industries, is at a faster rate than that of other areas of comparable population size. In the past 25 years, the population has grown by 81%. In the past decade alone, almost 500 industries have located there.

Memphis' annual purchase of power from TVA grew from 344,347,000 kilowatt hours in 1940 to 2,016,662,000 hours in 1955, or more than six times.

The rapid expansion of power demands in the Memphis area has resulted principally from the increase in the number of industrial plants, the population gain and the greater per capita use of electricity as pay envelopes have increased in size. New uses for electricity have been another contributing factor.

The new Memphis plant will be able to produce four times as much power as all the power currently used by the State of Vermont. By



K. M. Strange, Superintendent, J. C. Herring, Engineer, Keller F. Workman, Gulf Sales Engineer, in the Mississippi Power Company's Plant Eaton, Hattiesburg, Miss. The 22,500 kw G.E. turbine (far background) was put into service in 1945. The No. 2 G.E. unit, 22,500 kw, started in 1947. In 1949 the 22,500 kw Westinghouse turbine was installed. All three turbines have operated with Gulfcrest from the beginning.

Years of safe, sure, efficient lubrication ahead for these turbines with **GULFCREST**

Gulfcrest's unmatched record of performance in every type of steam turbo-generator guarantees safe, sure, efficient protection for these three units down through the years.

These units have operated with clean lubricating systems since going into service—no rust, sludge or foam. At last check, neutralization numbers were as low as ever.

Gulfcrest, super-refined by Gulf's exclusive Alchlor Process, lasts indefinitely. It has served in several large turbines for *over 20 years*, with no significant change in original characteristics! The Alchlor Process takes place *after* thorough

refining of carefully selected crude oils—and removes unstable hydrocarbons that normal refining doesn't remove.

Gulfcrest is the world's finest turbine oil, incomparably stable. Your Gulf Sales Engineer will recommend the proper grade for you—just call the nearest Gulf office.

GULF OIL CORPORATION GULF REFINING COMPANY

1822 Gulf Building
Pittsburgh 30, Pennsylvania



THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

1960, its power production will equal half that developed by the St. Lawrence River. By 1965, when production will have doubled in size, its output will equal all the power production of the St. Lawrence River.

Plant Design Features

The plant's operating floor will be 8.6 ft above the highest recorded

flood stage of the Mississippi River. This places the turbine room floor 5 to 5½ ft higher than the existing levee system. Coal will be delivered by barges from the current-free river harbor. A system of connecting roads will be located well above flood stage and will provide approaches from the adjacent natural high ground.

Efficiency and reliability in pro-

viding steady delivery of power will be assured by modern design, including duplicate auxiliary equipment. The steam generators are being designed for firing either by coal or natural gas. Gas will be used during the summer months when the city's Gas Division has a supply in excess of residential-industrial requirements. This will improve the load factor of the Gas Division.



Atlantic Steel's \$8½ Million Bar & Rod Mill Now in Operation

In mid-November, **Atlantic Steel Company, Atlanta, Georgia**, dedicated its new Morgan 13" Merchant Bar and Rod Mill—one of the fastest combination mills in the world. It has a speed of 5,000 fpm on rods and a production rate of 60 to 90 tons/hr for merchant products. The range of Dixisteel products from the mill will be rods, rounds, flats, angles, channels, and light sections of various sizes.

The ultra-modern new unit replaces a bar mill built in 1904. Products made on that mill have been a mainstay of the Dixisteel line for 50 years.

The Rust Engineering Company designed and erected both the mill and adjacent warehouse buildings, and installed all mill equipment, auxiliary equipment and utilities. The mill equipment was built by

Morgan Construction Company.

Steel billets are transferred from the billet mill by "straddle-buggy" and stocked in the mill billet yard. From there, they are placed upon a mechanical "billet unscrambler," which automatically unplies the billets into a single layer for delivery to the reheating furnace.

The furnace is capable of heating 90 tons of billets per hour to a rolling temperature of approximately 2150 F. Billets are discharged into the first mill stand by means of an electrically operated push-out.

Three strands of wire rods, ranging in size from No. 5 (.218") to ¼" are rolled simultaneously. From the finishing stands, the finished rods are coiled on laying reels. Larger sizes, up to 1¼", are rolled single-strand, and are coiled on pouring reels. They are then automati-



cally transferred to a hook conveyor for delivery to the inspection and storage area.

Merchant products are discharged from the finishing stands on to a



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Welding News

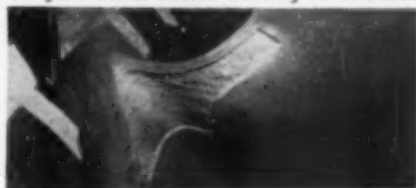
PUBLISHED BY EUTECTIC WELDING ALLOYS CORPORATION, 40-40 172 STREET, FLUSHING 50, NEW YORK, N. Y.

EUTEC-CHAMFERTRODE REMOVES "FATIGUED" METAL FASTER

By using Eutec-ChamferTrode and Eutec-CutTrode, an Oklahoma hydro-electric plant avoided time-consuming grinding away of "fatigued metal" and accomplished the quick repair of a turbine bucket with great savings in "downtime" and labor.

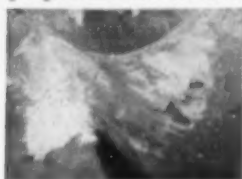
The bucket, part of a 57-ton turbine, was in danger of cracking because of fatigued metal formation. The bucket's inaccessibility prevented the use of grinding equipment to remove the fatigued metal before welding on stainless steel plates. Eutectic's District Engineer recommended Eutec-ChamferTrode and Eutec-CutTrode, high speed electrodes for gouging, chamfering, and piercing all metals, without the use of oxygen or extensive equipment.

First, the fatigued area was marked off and an outline cut with Eutec-CutTrode. Weldors then gouged out the defective



(Fig. A)

metal with Eutec-ChamferTrode (Fig. A). Gouging was accomplished far more quickly with ChamferTrode than would have been possible with any mechanical grinding equipment. ChamferTrode's special exothermic coating concentrates the force of the arc right at the point of application, producing a highly efficient metal removing tool.



(Fig. B)

Stainless steel plates were then tacked on with EutecTrode 680 AC-DC, an all purpose, high tensile, corrosion resistant electrode for very high alloy and carbon steels. Repair was completed by welding again with EutecTrode 680 AC-DC, which produced a smooth, porosity free weld of perfect density (Fig. B). The weld was deposited at the highest possible speed. Welding was done at lowest possible amperage and no warping occurred. Finished weld has exhibited high strength and wear.

(A-30)

WELDING MACHINE BASE WITHOUT DISMANTLING SAVES \$3200

Use of Eutec-ChamferTrode and Eutectic "Low Temperature Welding Alloys" to repair the heavy base casting on a planer without dismantling it from the planer saved an Idaho lumber company \$3200 and four months "downtime." To replace the base casting, which cost \$1200, the entire planer would have to be shipped to its East Coast manufacturer. This would have cost \$2000 in railroad fares and kept the planer out of production for four months.

Eutec-ChamferTrode was used to give a right angle chamfer to all broken edges on the casting. The welder then applied a dense, smooth weld of EutecTrode 27, a high strength, ferrous electrode for all cast iron repairs where machinability is not desired. The base casting was re-welded with Xyron 2-24, which permits "cold" cast iron welding from all positions without dismantling heavy sections. Xyron 2-24's "Frigid Arc" coating produced a dense, machinable weld, free from cracks and stress formations. Weldors have found that Xyron 2-24 gives very close color match and permits great ease of application.

(A-31)

EUTECROD 16FC LOWERS FINISHING COSTS

Warping and uneven welds caused by conventional high heat welding materials led a manufacturer of calculating machine carriage shells to try EutecRod 16FC, a



highest strength, "brazing type" alloy for joining steel and other metals. Precision standards for the carriage shells made warped parts unacceptable. Further finishing of uneven welds was an added cost to the manufacturer.

Use of EutecRod 16FC has resulted in lowered finishing costs and stronger welds. Great capillarity of EutecRod 16FC makes it ideal for thin forming operation required in welding carriage shells. EutecRod 16FC produces a smooth, porosity free weld requiring no further extensive finishing. It is applied at the lowest possible temperature without fusion of the base metal. No warping occurs. Ultimate tensile strength is up to 100,000 psi.

(A-32)

EUTECTRODE 680 AC-DC WITHSTANDS 1500 PSI

EutecTrode 680

AC-DC again demonstrated its high tensile strength in repairing the hydraulic compression chamber of an injection molding machine. Previous welds of conventional high heat welding materials all cracked under the stress of 1500 psi in the chamber.

Before replacing the chamber, at a cost of \$4200, the company called in Eutectic's District Engineer. He suggested EutecTrode 680 AC-DC, all purpose electrode for high alloy and carbon steels. Deposited at high speed and lowest possible amperage, EutecTrode 680 AC-DC gave a smooth dense, porosity free weld which has combined high tensile strength (up to 120,000 psi) with sufficient elongation to absorb compression chamber stress without cracking.

(A-33)



CAST IRON WELD SAVES \$6,000, FOUR MONTHS "DOWNTIME"

By using EutecRod 1804 to repair a 50 HP motor which had eight cracked fins at the end of its armature, a New England aircraft plant saved \$6000. This would have been the cost for removing the motor from the plant, repairing it, and re-installing it.

Company officials consulted Eutectic's District Engineer. He suggested repair with EutecRod 1804, a copper base, silver bearing, thin flowing alloy that produces high strength joints on close fitting operations. Using 15 lbs. of EutecRod 1804, a welder repaired the armature fins in less than six hours. Welds have shown excellent wear and conductivity. EutecRod 1804 does not require fusion of the base metal; its ultimate tensile strength is up to 50,000 psi.

(A-34)



Eutectic Warehouse—Service Centers
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Eutectic Welding Alloys Corporation 40-40 172nd Street, Flushing 50, N.Y.

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rackover cooling shed. After cooling, the bars reach the runoff tables and are sheared to scheduled lengths for immediate shipment or storage in the adjacent warehouse.

Buildings — mill building 740 ft long by 100 ft wide and 65 ft high; warehouse buildings are 260 ft by 100 ft; 52,000 sq ft and can accommodate 16 railroad cars at one time.

Utilities — 5,000 gallons of water are used per minute — 2,400,000 gallons per 8 hour shift; approximately 720,000 cu ft of natural gas is used per 8 hour shift; mill has 270 General Electric motors, with about 13,000 total hp.

Lubrication — an automatic lubrication system (furnished by the DeLaval Div. of Dravo) contains 20,000 gallons of oil (2 tank cars) and 26 filters.

Completion of the new mill is part of the \$16 million modernization and improvement program started by Atlantic Steel after World War II. Other phases already in operation, include a second 75-ton electric furnace, expanded fabrication and warehouse division facilities; and a new administration building.

Lord Mfg.—Atlanta

Lord Manufacturing Company of Erie (Pa.) has announced the opening of a new field office in Atlanta, Georgia.



This office will provide direct sales of Lord bonded rubber products and furnish complete engineering service on vibration control to Georgia, Florida, South Carolina, North Carolina, Tennessee, Mississippi and Alabama. Located at 3131 Maple Drive, N.E., Room 206, the Atlanta office will be managed by Ernest H. Atkinson.

Diamond Alkali—Tex.

Diamond Alkali Company, Cleveland, Ohio, a major producer of both inorganic and organic chemicals for industry and agriculture, has announced plans to proceed with designing and engineering a multi-million-dollar facility for manufacturing acetylene.

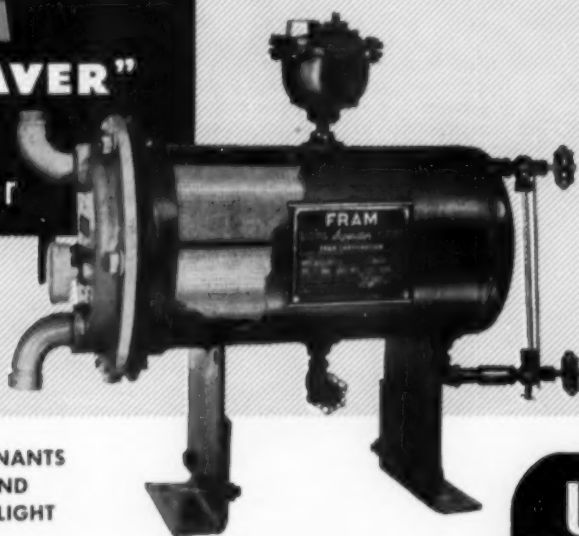
In making the announcement, Loren P. Scoville, General Manager of the Company's Chlorinated Products Division, said the proposed plant will be located at Diamond's Deer Park Plant at Houston, Texas.

Engineering studies for the project, already under way, are expected to be completed by April, 1957, with construction slated to start in the fall the same year.

Further broadening Diamond's interest in organic chemicals, this entrance by the Company into a new field of industrial chemistry is planned to coordinate the growing productive capacity of the firm's polyvinyl chloride resin plant at Deer Park.

(Continued on Page 24)

FRAM "SPACE SAVER" liquid separator filter



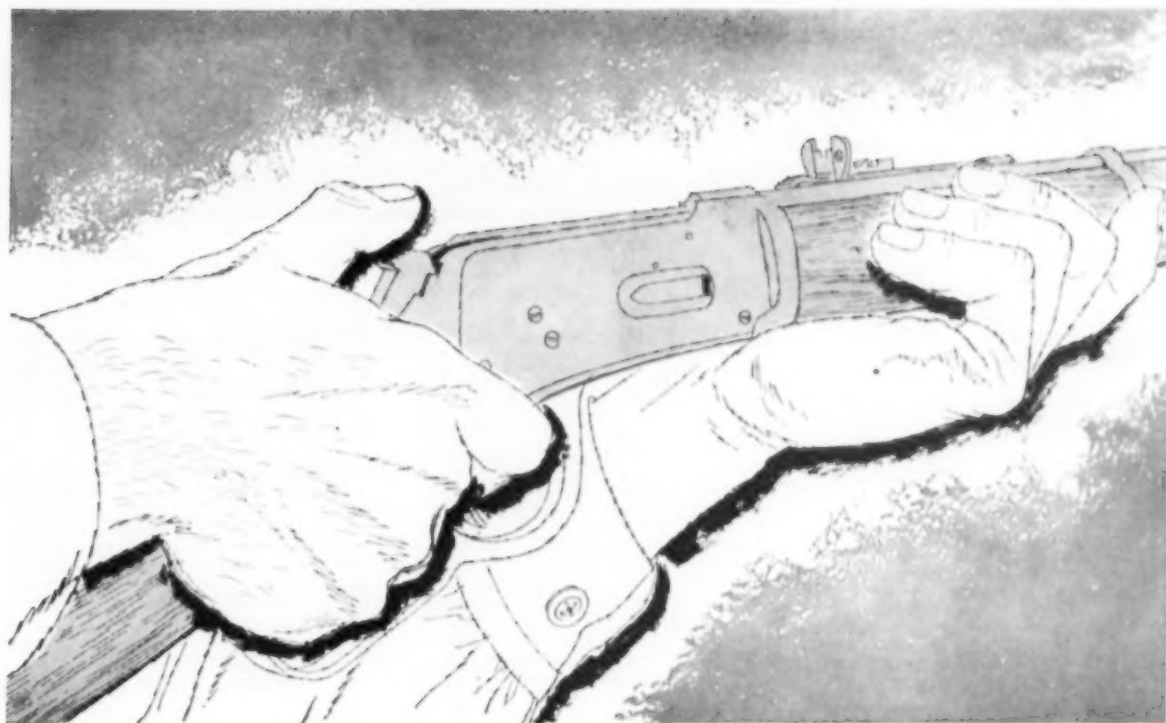
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1—Package Boiler—New compact, low cost package unit (oil or gas fired) for small space requirements is described in Bulletin DK-1. Pressures to 325 psi, steam capacities to 45,000 lb/hr.—E. KEELER CO.

3—Boiler Cleaning—The Vulcan sequential, automatic soot blowing system, described in Bulletin 483, offers effective, economical boiler cleaning. Any boiler can be cut in or out of automatic sequence or blown individually from control panel.—COPES-VULCAN DIVISION, BLAW-KNOX COMPANY.

9—Free Coal Counseling—General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY.

11—Feedwater Treatment—Bulletin describes liquid and dry (Braxton & Flako) boiler feedwater treatment recommended for removal and prevention of scaling and corrosion during use of many types of water and for prevention of foaming and carryover.—ANDERSON CHEMICAL CO.

15—Stokers—Bulletin covers complete line of underfeed coal stokers and units for profitable disposal of wood waste; illustrated case studies; meet any city's smoke ordinance.—McBURN EY STOKER & EQUIPMENT COMPANY.

25—Packaged Boilers—Bulletin PSG-2 has line drawings, photos, and engineering data on portable type units from 10,000 to 40,000 lb/hr steam capacities. In standard pressures of 175, 250, and 375 psi.—HENRY VOGT MACHINE CO.

35—Unit Steam Boilers—Catalog AD-100—Gives complete information on oil and gas fired "Self Contained" boilers, 15 to 500 hp, 15 to 250 psi for processing and for heating. Gives features, applications, efficiencies, capacities and dimensions.—CLEAVER-BROOKS CO.

44—Fan Stacks—I-D fan, breeching and stack integrated in a single unit described in Bulletin 1-PCD-1. Straight through breeching assures high, predeterminable efficiency. Structural steel requirements reduced and installation simplified.—PRAT-DANIEL CORPORATION.

48—Boiler Tubes—Booklet gives information on care of boiler tubes, causes of chemical attack, etc. Contains charts of weights, working pressures, etc. for boiler tubes and pipe.—BOILER TUBE COMPANY OF AMERICA.

76—Gas Burner—Bulletin—Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing—in a horizontal plane through fire doors or small openings over handfired coal grates or stokers—or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

119—Deserating Heaters—Bulletin WC-110—Describes a new development—the package type heater for smaller boiler plants, completely equipped with all accessories. Flow diagrams, photographs of installations, etc.—GRAVER WATER CONDITIONING CO.

120—Continuous Blow-Off Equipment—Publication No. 5700 shows how equipment can effect substantial savings in heat and fuel by returning the heat contained in the blowoff. System also maintains uniform dissolved solids concentration in boiler. Typical applications and lists of users are included.—COCHRANE CORPORATION.

138—Steam Pump Maintenance—Bulletin G-2280 P, 23 pages, "How to Install and Take Care of Steam Pumps" gives 28 tips on proper installation and 54 tips on field-proven care techniques.—WORTHINGTON CORPORATION.

144—Fluid Drives—Catalog, 24 pages—Describes and illustrates Type VS Class 4 Gyrol fluid drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp.—AMERICAN BLOWER CORPORATION.

162—Condensate Return Pumps—Catalog No. H-1 includes photos, dimension drawing, selection tables, and operating data on "NCR" Single and "NCRD" duplex condensate return pumps, especially designed for low pressure steam heating systems and which handle condensate up to 200 F.—C. H. WHEELER MFG. CO., ECONOMY PUMP DIV.

177—Hand Pumps—Bulletins 320 and 350 describe and illustrate hand pumps used for transferring liquids from drums, vats, tanks, underground storage tanks, etc.—BLACKMER PUMP COMPANY.

183—End Suction Pumps—Packaging plan, covering 22 pumps in sizes 1-15 hp, described in Bulletin B-2319. Easy stocking, storing, ordering and application with "redipak" plan. Features selection charts, head-capacity performance curves, etc.—PEERLESS PUMP DIVISION.

INSTRUMENTS—METERS CONTROLS—REGULATORS

205—Draft Gages—Bulletins describe inclined, vertical tube, air filter gages, straight lire and dial pointer type, minified draft and receiver type gages, velocity gages and pitot tubes, gas analyzers and steam calorimeters.—ELLISON DRAFT GAGE CO.

208—Water Level Alarms—Brochure DI—Float operated low and high water level alarms and fuel cut-offs, for low and medium pressure boilers, tanks and other vessels.—RELANCE GAUGE COLUMN CO.

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247—Plant Control Equipment—Bulletin 8-1-56 illustrates company's complete control equipment (gages, water columns, cocks, flow indicators, etc.) for industrial and power plants.—ERNST WATER COLUMN & GAGE CO.

263—Meters and Controls—8 page Bulletin G15-1 describes measuring, transmitting, receiving, recording, and indicating instruments and control components for power and process applications. Includes literature reference for each product

as well as twenty-four instrument and control applications.—BAILEY METER COMPANY.

274—Multi-Purpose Gas Regulators —Bulletin P-99—Illustrates and describes the new Type "99" multi-purpose gas regulator, with capacity range from 0 to 143,000 cu ft/hr, inlet pressures up to 150 lb, and reduced pressures of 4 oz to 50 lb. —FISHER GOVERNOR CO.

287—Color-Port Water Gage —Bulletin WG-1814 describes the new gage for high pressure boilers (up to 3300 psi). Gives full details on design and operation and shows how it gives greater visibility and greatly reduced maintenance requirements. —YARNALL-WARING COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

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307—Condensate Drainage Control — Publication 6025 describes units for improving quality of heat transfer in process equipment through continuous return of condensate to boiler at high temperature and pressure. Lists many cases substantiating claim for increased heat transfer, more production with less fuel. — COCHRANE CORPORATION.

310—Compressor Troubles — Bulletin PC-509 P helps locate and correct air-cooled and water-cooled compressor troubles.—WORTHINGTON CORPORATION.

312—Low Temperature Welding — Wall chart TIS 2616 lists torch and arc welding applications for all metal-working jobs. Enables the welder to adopt the best alloys and procedures for repairs. Helps stock clerks and purchasing agents concerned with welding alloy selection. —EUTECTIC WELDING ALLOYS CORPORATION.

313—Incineration — Bulletin 575 gives information concerning the modern way to solve waste disposal problems. Designed to save space and money, plus low maintenance. — BRULE INCINERATOR CORP.

315—Pressure Vessels—Catalog 100 discusses your plate fabrication problems and shows how company custom-fabricates hot water storage heaters, tanks, air receivers, blow-off tanks, etc. Corrosion resistant linings and materials featured. Suggested specifications and other valuable technical data given.—J. J. FINNIGAN CO.

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479—Multiport Drainers—Publication 5201 containing 8 pages describes units for removing large quantities of condensate under vacuum or pressures, as from evaporators, heaters, separators, coils, or steam lines (up to 200 psi maximum). Lists discharge capacities, shows features and typical installations.—COCHRANE CORPORATION.

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ous flexibility analyses of techniques can cut piping design and construction costs.—THE M. W. KELLOGG COMPANY.

493—Unions & Valves—Complete company line of pipe unions and check valves covered in Catalog 56. New Four-Star lug nut unions & spring controlled check valves included.—CATAWISSA VALVE & FITTINGS COMPANY.

495—Blow-Off Valves—Bulletin E-125 describes design and construction of quick-operating valves, angle valves, Y valves and duplex units specifically designed for boiler blow-off service.—EVERLASTING VALVE CO.

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536—Rod and Shaft Packings—Bulletin A-131, 8 pages—Describes Garlock patented "lattice braid" rod and shaft packings; discusses construction features, materials available, sizes, forms and service reports from users in various industries.—THE GARLOCK PACKING CO.

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605—Coupling Selection Chart—22" x 17" chart greatly reduces the time necessary to select a flexible coupling. Big time saver to help you choose the right coupling for your job.—MORSE CHAIN COMPANY.

606—Power-Rotated Jib Crane—Bulletin describes all-electric 360° revolving jib cranes in 6, 7½, 10 and 15 ton capacities which provide power handling for 1936 sq ft of floor space. Design permits fraction-of-an-inch control.—R. G. LETOURNEAU, INC.

607—Motor Drives — Bulletin No. 1610-BI P contains information on how to select variable speed drives to meet any specialized requirement. Describes engineering features, remote controls, separate motor drive, and other company mechanical power transmission products available. — WORTHINGTON CORPORATION.

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620—Conveyor & Power Transmission Chains—Catalog N. 34, 30 pages — Describes American Standard stock chains having figure 8 contour links, and chain pitch twice that of corresponding American Standard roller chains.—DIAMOND CHAIN COMPANY, INC.

624—Freight Elevators—Booklet A-414 describes the new Plunger Electric Freight Elevator designed for low-rise, light and heavy duty freight handling requirements. — OTIS ELEVATOR COMPANY.

656—Speed Reduction—Bulletin 191 outlines three styles of speed reduction — integral gear motors, speed reducers with separate motors, and speed reducers alone. Highlights all the important engineering advantages of Sterling drives and contains important information for consideration when selecting speed reducers. — STERLING ELECTRIC MOTORS, INC.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700—Water Conditioners—4 p brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. —ANDERSON CHEMICAL COMPANY, INC.

704—Water Conditioning—Brochure describes company's engineering services—zeolite water softeners, filters and purifiers, modernized and rebuilt water softeners, aerators and degasitors and process and boiler water conditioning. — SOUTHERN WATER CONDITIONING, INC.

705—Test Your Tower—Bulletin offers simple, proven method by which you can determine how closely your actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. — THE MARLEY COMPANY.

USE READER SERVICE

709—Heating & Ventilating Units—17 sizes in "HC" Line described and illustrated in Catalog 344. Air deliveries from 1,280 cfm to 32,500 cfm; Heating capacities from 26,200 Btu/hr to 2,227,000 Btu/hr. — McQUAY, INC.

713—Electric Precipitators—26 page Bulletin 104 shows how units meet five engineering requirements —Positive control of gas flow; high, uniform electrode emission; Effective continuous cycle rapping; Simple, rugged construction; and Safe, trouble-free high voltage equipment. Gives 9 time-tested steps to a successful installation.—BUELL ENGINEERING COMPANY.

714—Industrial Heaters — Bulletin P-154 — Describes "Panelbloc" infra-red unit heaters available in 62,500 btu and 125,000 btu input. No fan, motor, or electrical connection is needed. Heating is accomplished by guided radiation. The units may be used with any commercial type gas fuel.—THERMOBLOC DIV. OF PRAT-DANIEL CORP.

722—Packaged De-Ionizers — Bulletin PK describes complete line of de-ionizers, which produce chemically pure water at flow rates up to 1000 gph. Standardized units, shipped from factory fully-assembled, eliminating complicated installation problems, and virtually eliminating service problems. Recommended for laboratory and plant production uses.—ILLINOIS WATER TREATMENT COMPANY.

727—Zeolite Water Softeners—Bulletin WC-108 — Explains the chemistry of the sodium ion-ex-

change and hydrogen ion-exchange processes. Describes the design of Graver softeners and accessories. Many equations, tables and illustrations.—GRAVER WATER CONDITIONING COMPANY.

744—Packaged Water Chillers—Bulletin 5925 describes the mechanical specifications for all sub-assemblies and components in the Type CC packaged water chillers for air conditioning or industrial cooling applications. Includes a recommended selection procedure, construction details, and an explanation of construction features. Gives advantages to the user of the completely packaged and tested water chillers. — AMERICAN BLOWER CORPORATION.

ELECTRICAL

841—Applying Electric Heat — "101 Ways to Apply Electric Heat"—Gives illustrated case histories showing experience-tested methods of applying Chromalox electric heating elements. Physical aspects of installation are shown along with the description of the problem, solution and advantages obtained.—EDWIN L. WIEGAND CO.

852—Autotransformer Starter—with air break contacts up to 75 hp, 220 v; 150 hp, 440-550 v is described in Bulletin 646. Silver alloy contacts stay in good condition without filling, cleaning or dressing. — ALLEN-BRADLEY.

855—Wiring Analyzer — 4 page bulletin describes Model 301 Adequate Wiring Analyzer which quickly, simply and easily tests wiring without confusing calculators or slide rules. — SPRAGUE ELECTRIC COMPANY.

861—Electrical Protection System — Bulletin HCS—Describes "Fusetron" dual-element fuses which save recalibration and maintenance costs. Eliminates down-periods caused by needless blows and saves on installation costs. Available in all sizes from 1/10 to 600 amperes, both 250 and 600 volt types. Also in plug types for 125 volt circuits. — BUSSMANN MANUFACTURING COMPANY.

OPERATING AIDS SUPPLIES & MISCL.

909—Industrial Skin Cleanser—Folder describes Vi-Lan Clean, a non-alkaline, non-acid, all-purpose antiseptic skin cleanser that prevents dermatitis and other skin conditions. Self-service dispensing units. — DAMERON ENTERPRISES, INC.

937—Steel Measuring Tapes—Complete catalog describes full line of measuring tapes from 6 to 100 ft, including wide blade tape with upright measurements. — EVANS RULE CO.

(More Items — Page 96)

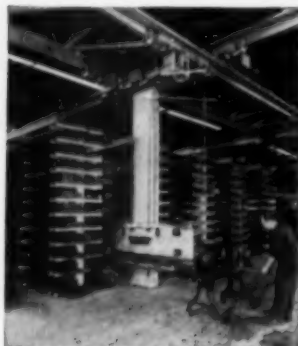
Neat, convenient and efficient steel bar storage stacked mechanically by the American MonoRail Stacker in narrow aisles



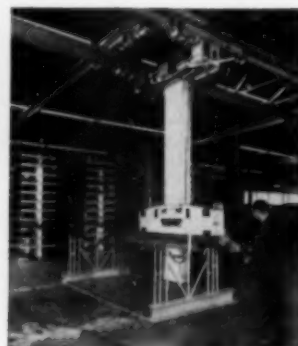
HOW'S THIS FOR STEEL STORAGE!

American MonoRail engineers, working with Hawkrige Brothers Company, designed this system for storing bars, rods and other long steel shapes.

Note the extremely narrow aisles and maximum height of racks. Bars and rods, 20-22 feet long, are placed in pans 18 feet long. The American MonoRail Stacker transfers these pans to either side of an aisle for storage.



MonoRail Stacker forks support bar in saw. Saw with extension rolls to any convenient spot in the warehouse.



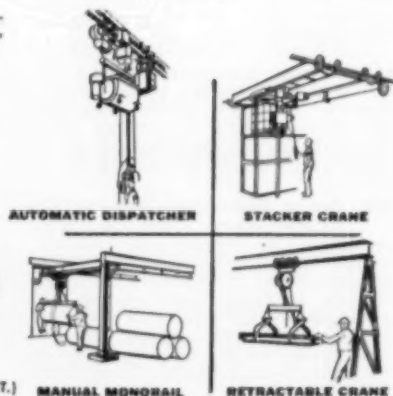
American MonoRail Stacker lowers a banded bundle of bars over prongs which ingeniously splits bands, lets bars roll into trough for pick-up in a tray.

Photos: Courtesy of Hawkrige Brothers Company, Waterbury, Conn.

Member of Materials Handling Institute - MonoRail Association



AMERICAN
MonoRail
COMPANY

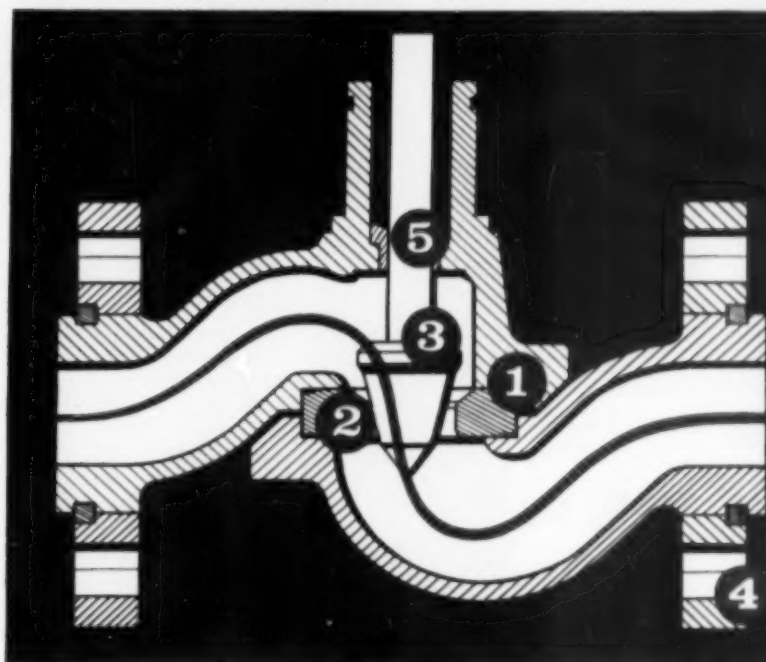


13105 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

ANNIN BODY DESIGN

...THE SOUNDEST APPROACH TO TROUBLE-FREE FLUID CONTROL

Reduces body turbulence and erosion • Longer seat ring life—retains tight closure • High lift in all sizes for better control—greater rangeability • Fewer parts—simplified and much lower maintenance.



Annin Valves are the answer to the complex fluid control problems common in the process industries—Chemical, Petroleum, Paper, Steam, Power Plants, and many others. Today, Annin Valves are recognized by control engineers and valve designers as the outstanding valve development of the past twenty-five years for the control of hot, cold, erosive, or viscous liquids.

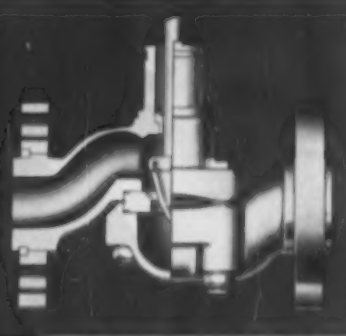
1 BODY. Single seat split body construction eliminates pockets and shoulders... reduces erosion.

2 SEAT RING. The body flanges retain seat in perfect alignment with valve plug.

3 VALVE PLUG AND STEM. Valve plugs are contoured to provide either linear, percentage, or semi-throttle characteristics... reduce turbulence, wire drawing, plug vibration and noise.

4 SEPARABLE FLANGES. Can be interchanged at will. Carbon steel flanges can be mounted on alloy bodies for economy.

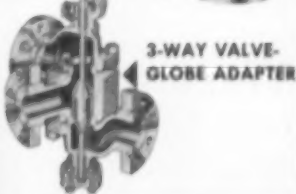
5 PLUG GUIDE. Hard metal guides of close tolerances can be inserted through stuffing box without resorting to threads, welding, pressing or staking.



GLOBE BODY ▲

The basic form of all Annin Valves. Reduces number of parts 50 to 75%, lowers initial costs, saves on parts inventory and maintenance.

OTHER BODY DESIGNS PROVIDE FLEXIBILITY IN INSTALLATION



ANNIN THE ANNIN COMPANY
6570 EAST TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

Control VALVES

New Automatic Precipitator Control by

WESTERN PRECIPITATION

offers many vital advantages...

1 LONG LIFE

This new control has indefinite life expectancy under all types of operating conditions. There are no tubes to replace, no high speed relays, counters, or timers to maintain. All circuitry consists of rugged "static" devices that have unusually long life!

3 STABILITY

Under short circuit, open circuit or other varying conditions, this control is completely stable and inherently trouble-free!

2 RELIABILITY

Optimum Precipitator power input is maintained regardless of operating conditions. The sensing control is simple, positive, accurate—and automatically evaluates the spark "Power Value" (intensity and frequency)—not just frequency or intensity alone.

4 MODEST COST

Modest initial cost coupled with negligible maintenance assure optimum operating efficiency (therefore lower operating costs) throughout many years of continuous service.



WHEN using a Cottrell Precipitator for collecting dust, fume, fly ash or other suspensions from industrial gases, it is essential at all times to impress on the high voltage system the highest possible voltage and current without "flashover". Depending upon gas conditions, dust loading and other variable factors, the optimum voltage and current requirements vary widely from one minute to the next. Therefore, the vital importance of a simple, trouble-free and highly sensitive Precipitator Control is self-evident.

This new Western Precipitation Automatic Precipitator Control—a product of the organization that has consistently led in the application of Cottrell Precipitators for industrial gas cleaning—combines vital advantages found in no other competitive equipment. Our nearest representative will be glad to supply complete details. Or write direct!

Why not modernize your present out-dated Precipitator installation? The Western Precipitation Automatic Precipitator Control can be installed on any Cottrell unit. For further information contact our nearest office!

Western Precipitation Corporation

Designers and Manufacturers of Equipment for Collection of Suspended Material from Gases
...and Equipment for the Process Industries

Main Offices: 1052 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA

Chrysler Building, New York 17 • 1 North La Salle Street Building, Chicago 2 • Oliver Building,
Pittsburgh 22 • 3252 Peachtree Road N. E., Atlanta 5 • Hobart Building, San Francisco 4

Precipitation Company of Canada Ltd., Dominion Square Building, Montreal
Representatives in all principal cities



COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIR Reverse-Jet Filters
HOLD FLITE Processors



This Bailey Meter Control System is —

Saving Fuel at Appliance Park

★ General Electric Company at its Appliance Park Boiler House, Louisville, Ky. has found that Bailey Controls help to save fuel by continuously maintaining desired operating conditions.

With a Bailey-engineered control system you can count on a high output of available energy per unit of fuel.

Here's why:

1. Suitable Equipment

When you receive equipment recommendations from a Bailey Engineer his selections come from a complete line of well-engineered and carefully tested products.

2. Seasoned Engineering Experience

Your local Bailey Engineer brings you seasoned engineering experience based on thousands of successful installations involving problems in measurement, combustion, and automatic control.

3. Direct Sales-Service—close to you

For your convenience and to save time and travel expense there's a Bailey District Office or Resident Engineer in or close to your industrial community.

For greater fuel savings, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're glad to stand on our record.

AI28-1

FORMULA
for Cutting
Steam Costs

+ Bailey Design
+ Bailey Engineering
+ Bailey Service
= Greater Savings
per Fuel Dollar

BAILEY
METER COMPANY

1028 IVANHOE ROAD

CLEVELAND 10, OHIO

Complete Controls for Steam Plants



Controls for

COMBUSTION
FEED WATER
TEMPERATURE
PRESSURE
LIQUID LEVEL
FEED PUMPS

PACKAGED TOWER POWER

"Power comes in one piece" on a Marley cooling tower—a completely integrated unit that consists of motor, drive shaft, couplings, Geareducer* and fan hub, assembled and permanently aligned on a rugged unitized steel support.

Every component of this packaged power unit (except the motor of your choice) is Marley-designed and manufactured exclusively and specifically for cooling tower use. Each is engineered for individual mechanical excellence and for functional integration into the complete assembly. All are backed by a single responsibility for dependable performance and economical maintenance, and that backing is the Marley guarantee.

These units are standard for all Marley industrial towers and, together with Marley multi-blade aluminum fans, are available for modernization of towers of any make. Installing the pre-assembled Marley power package for replacement service reduces shut-down time by days.

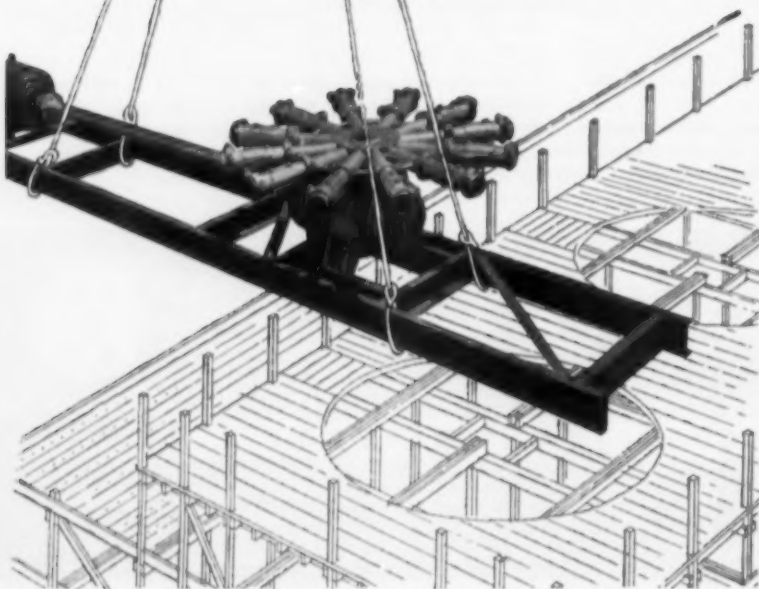
For detailed information on "packaged power" for new or existing towers, call the Marley sales engineer in any of 55 major cities.



The Marley Company

Kansas City, Missouri

Founder-Member Cooling Tower Institute



News (Continued)

(Starts on Page 10)

Bassons Industries—Texas

Bassons Industries Corporation, one of the nation's largest plastic fabricators, with headquarters in New York City, has announced that they will establish a branch plant at Nacogdoches, Texas.

The Texas facility, representing a multi-million dollar investment, will produce plastic and Teflon insulated wire and cable products for construction, communications, air craft missiles and oil exploration, in addition to plastic pipe for irrigation, oil and chemical transmission, in sizes of one-half inch to six inches in diameter. Also to be produced in the Texas plant will be reinforced plastic air craft parts and sub-assemblies for the major air frame producers.

Actual operations in Nacogdoches will commence immediately after the first of the year. The company will employ up to 300 people during the first twelve months of operation and, with the exception of one or two engineers, the Texas branch will be entirely staffed by local manpower.

Within two weeks, corporate planning and operating executives will visit Nacogdoches to select the exact site for the plant. This will consist of 35,000 square feet plus ten acres for future expansion. It is planned to have machinery in Nacogdoches as soon as the building is completed.

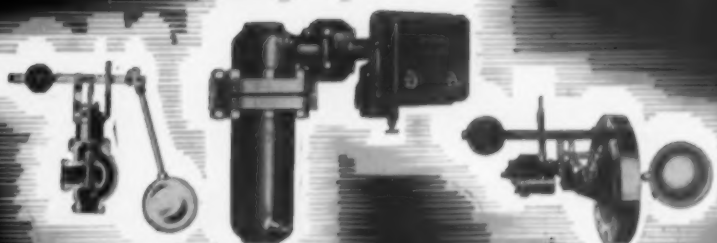
This will be the first high pressure pipe manufacturing plant in Texas. As one of the few producers of plastic pipe in the country, Bassons' decision to locate at the new site offers immediate benefits to all concerned; lowered production and transportation costs to Bassons and its customers, ultimate employment of some 1,000 persons in the Nacogdoches area and greater and more rapid availability of necessary pipe to the petrochemical industries, as well as the educational advantages.

The Texas plant will supply its products not only to the immediate vicinity but will service the West, Southwest and Far West as well as Mexico, South America and the Caribbean.

Bassons Industries currently operates two plants with five operating divisions, utilizing over 150 thousand square feet of floor space and employing approximately 500 people.

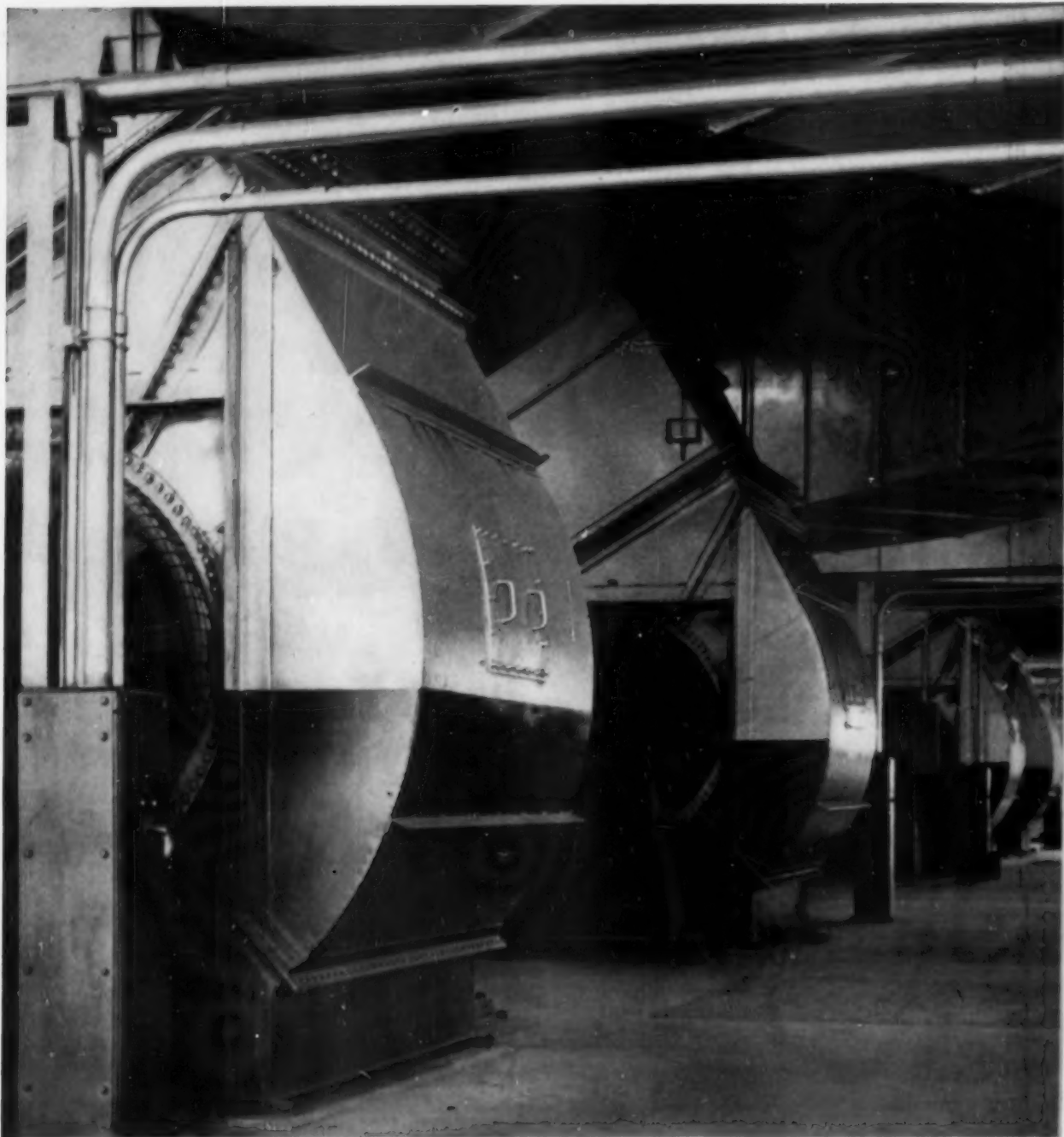
More News — Page 90

*the tough
Liquid Level Control
jobs go to*



FISHER GOVERNOR COMPANY
MARSHALLTOWN, IOWA • WOODSTOCK, ONTARIO

5 YEAR RECORD! 176 Customers

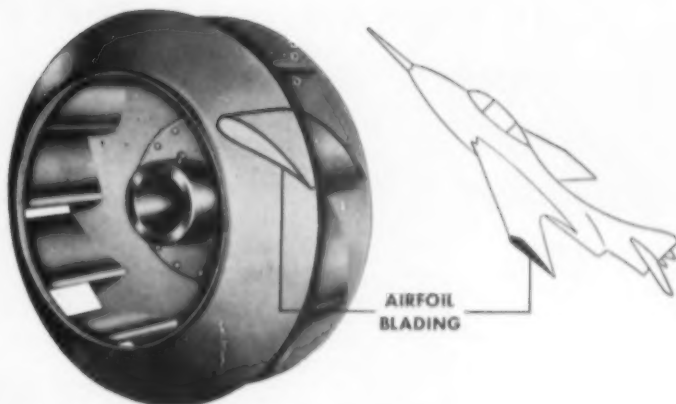


5 YEARS' USE PROVED! Westinghouse first announced the application of Airfoil Blade design to Centrifugal fan wheels in 1950 — has since supplied more than any other company to leading power plants. Proved in use, benefits to

users include reduced turbulence in air flow pattern which markedly reduces operating noise . . . up to 92% mechanical efficiency because of backwardly-inclined blades . . . lowest cost operation.

Select Westinghouse Heavy-Duty Airfoil Fans

**Today 381 Fans serve
Utilities and Industry**



Some of the reasons why 176 leading utilities and industrial plants all over the country have specified Westinghouse-pioneered Airfoil Blading design in centrifugal fan wheels are lower operating costs, marked reduction in operating noise, and *up to 92% mechanical efficiency delivered on the job.*

Since its introduction 5 years ago, this Westinghouse design has proved itself in mechanical draft and heavy-duty air supply services — with these advantages. Ideally-suited for parallel operation for higher CFM

delivery. Self-limiting horsepower characteristic of the wheel reaches its maximum in normal range of selection. True non-overloading horsepower is assured by this wheel design, and wheel proportions permit direct drive by standard squirrel-cage induction motors without costly shafting and outboard bearings.

Ask your nearest Sturtevant Power Sales Engineer for full details, or write Westinghouse Electric Corporation, Sturtevant Division, Dept. 5A, Hyde Park, Boston 36, Massachusetts.

Westinghouse Heavy-Duty Airfoil Fans Now Serve These Leading Plants

- Consolidated Edison
- Powaters-Southern Paper Co.
- Kaiser Aluminum & Chemical Corp.
- Ohio Valley Electric Corp.
- Duke Power Company
- Delaware Power & Light Co.
- International Paper Company
- Duquesne Light Co.
- Indiana-Kentucky Electric Corp.
- Pennsylvania Electric Corp.
- Southern California Edison Co.
- Tennessee Valley Authority
- Pittsburgh Plate Glass Co.
- Philadelphia Electric Co.
- Commonwealth Edison
- Dayton Power & Light
- Gulf States Utilities, Louisiana
- Cleveland Electric Illuminating Co.

and 158 more plants — a total of 381 fans!



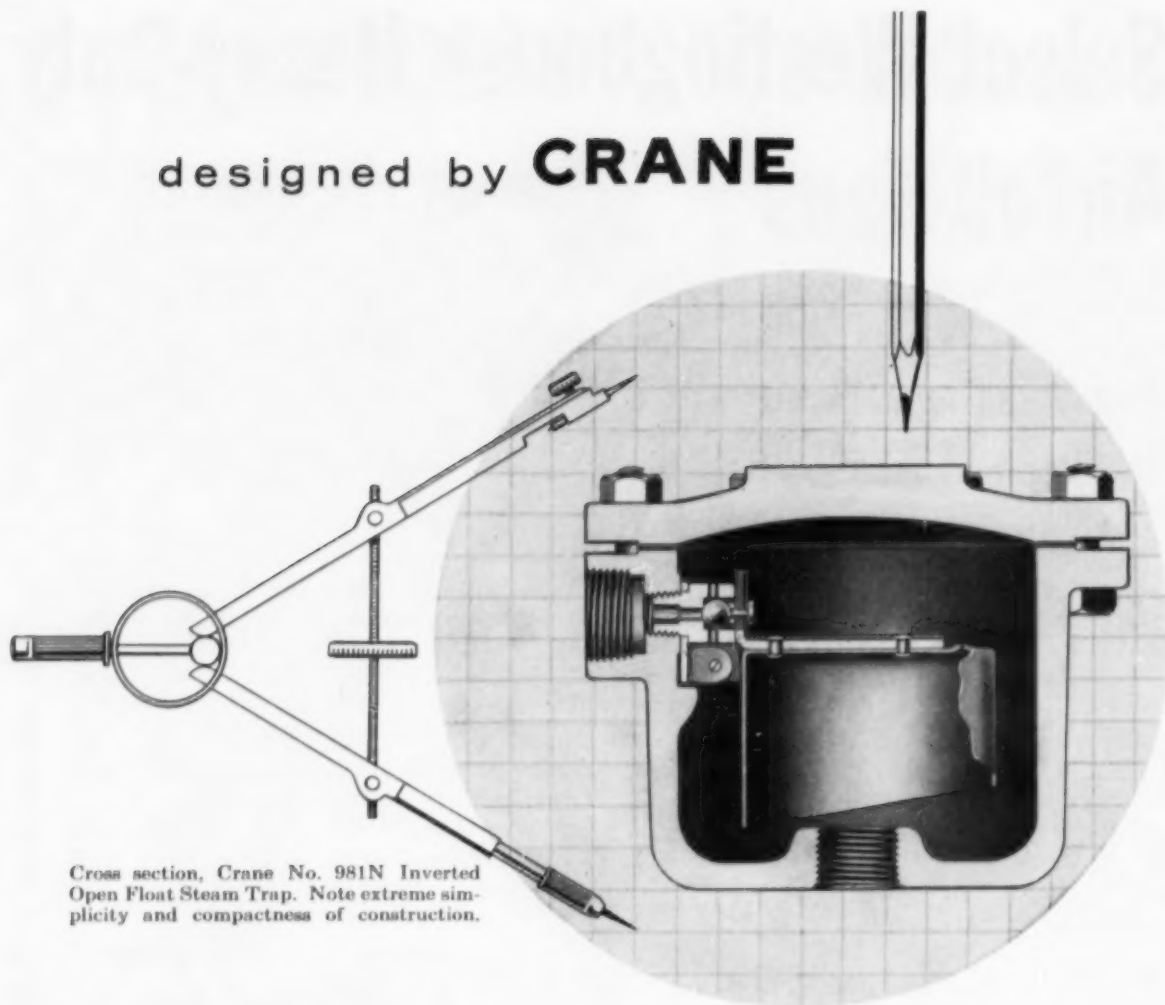
Fan installation at Astoria Station, Con Edison of N. Y. . . . first to specify Westinghouse Airfoil fans. 8 fans in 2 parallel sets supply 600,000 cfm of forced draft air to twin boilers.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S **Westinghouse**

J-80602

designed by **CRANE**



Cross section, Crane No. 981N Inverted Open Float Steam Trap. Note extreme simplicity and compactness of construction.

to keep your steam lines

HOT, DRY and **EFFICIENT**

With an apparatus heated or operated by steam, you'll save fuel and insure operating efficiency by installing Crane Inverted Open Float Steam Traps—designed to drain condensate accumulation automatically and instantly.

The exceptionally rugged, simple construction of Crane Steam Traps provides high

discharge capacities in relation to their size—permitting more compact installations. They are available in working pressures from 1 to 300 pounds saturated steam, sizes $\frac{1}{2}$ to 1 inch.

For literature giving ordering and installation instructions, see your Crane Representative or write to address below.

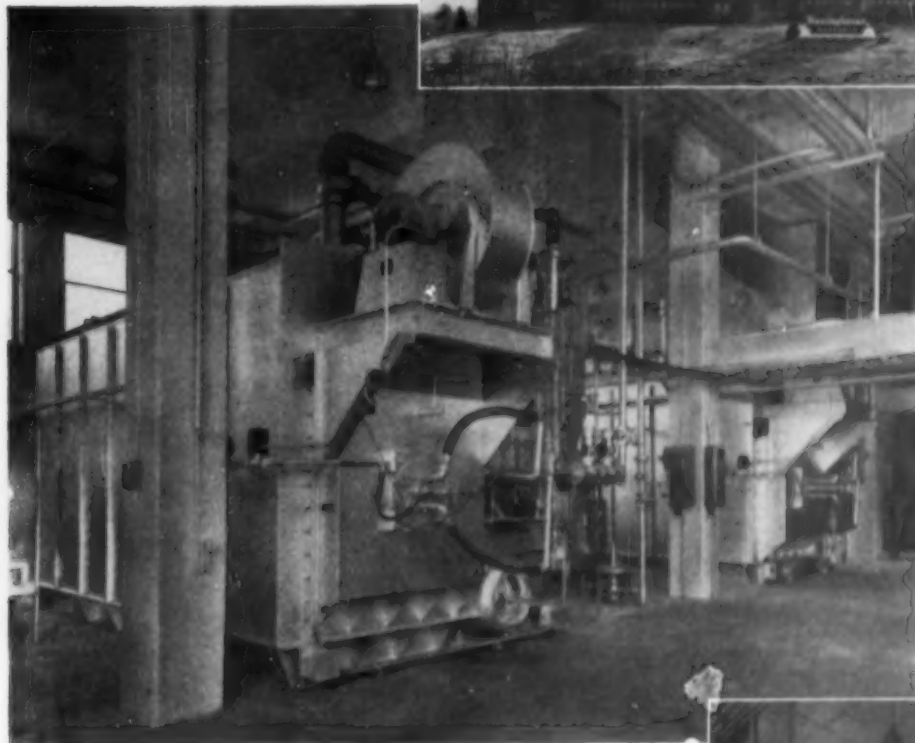
CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

TWO NEW KEELER TYPE D-K PACKAGE BOILERS SERVE NEW WESTINGHOUSE RESEARCH LAB

Westinghouse Research Laboratory
Churchill Baro, Pittsburgh, Pa.



KEELER

Type DK

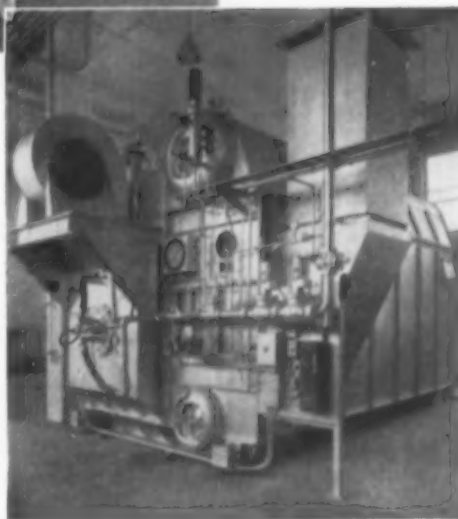
Newest member of the Keeler line—a compact, low-cost package steam generator (oil or gas fired) for limited space requirements.

Westinghouse Electric Corporation has selected two Keeler D-K Package Steam Generators to supply their modern new research laboratory with low cost steam for process and heat requirements. Keeler Boilers of various types and sizes are serving Westinghouse plants throughout the country and their efficiency, economy and dependability led to the purchase of the two D-K units pictured here.

Each of the new Keeler Type D-K Boilers shown are capable of generating 20,000 lbs. of steam per hour. The complete "package" includes all burning equipment, controls, safety devices and accessories for gas fired operation.

The Type D-K is made in oil or gas fired units with capacities from 8,000 to 45,000 lbs. of steam per hour, standard design pressure of 200 psi and a maximum design pressure of 325 psi. The D-K is specifically designed for use in power plants which will not accommodate long boilers of other types.

It incorporates the proven efficiency and economy of Keeler Water Tube Steam Generators in a new, compact design—a comparatively wide and short boiler that's completely steel encased and insulated, ready for quick hook-up and operation. Write or phone for complete information on this compact, new Package Power Plant!



The Seal of Quality in Water Tube Boilers

Write For Bulletins

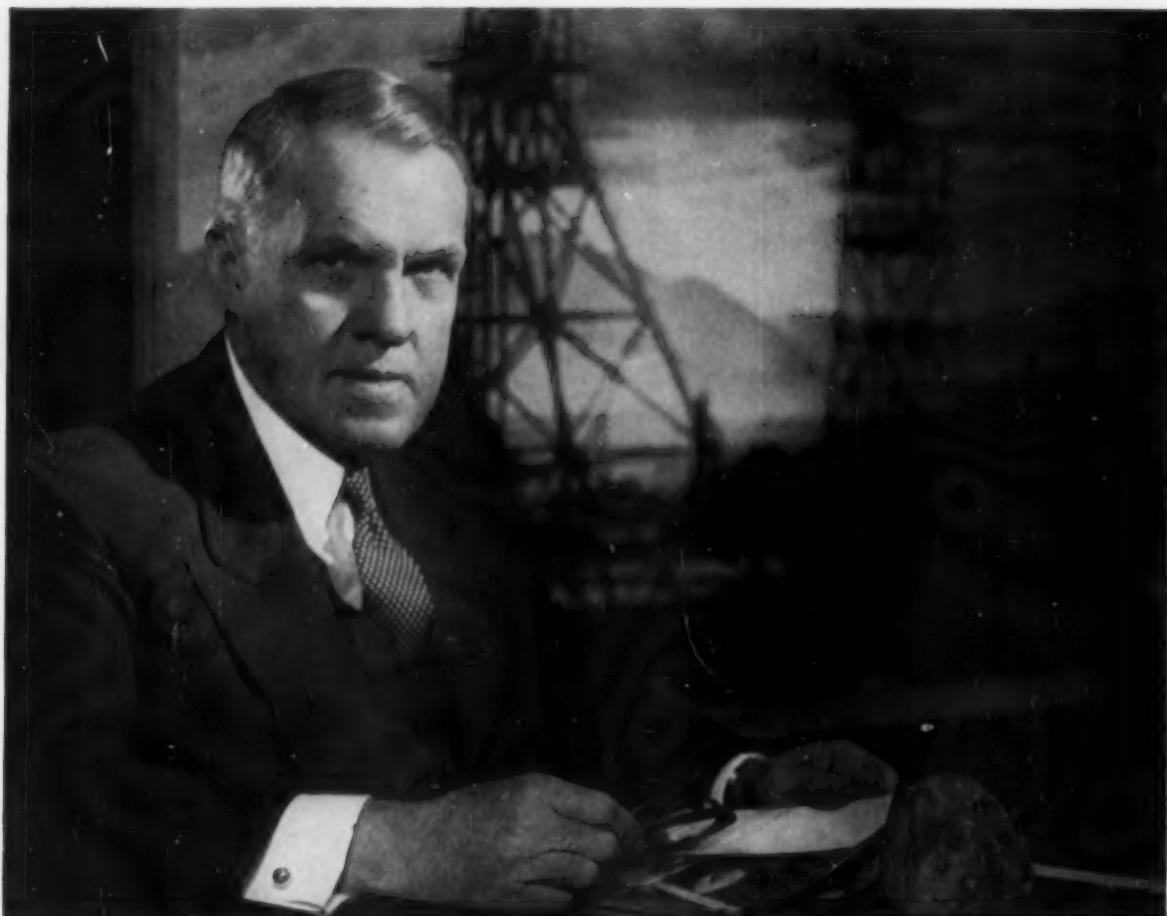
No. DK-1: Type DK Package Boilers
No. F-14: Type CP Package Boilers
No. M-2A: Type CPM Package Boilers
No. MK-1: Type MK Boilers



— ESTABLISHED 1864 —

E. KEELER CO.

West & Church Sts. • WILLIAMSPORT, PA.
— OFFICES IN PRINCIPAL CITIES —



CLYDE E. WEED

Portrait by Fabian Bachrach

“22,514 Anaconda Employees Are Buying U. S. Savings Bonds

“In October, 1955, only 34% (11,140) of the nearly 33,000 Anaconda organization employees in this country were buying U. S. Savings Bonds through the Payroll Savings Plan.

“Late in 1955, we conducted a simple person-to-person canvass which put a Payroll Savings Application Blank in the hands of every employee. There was no pressure, no special promotion—just the Application Blank. Our employees did the rest.

“Recently, our records showed that 22,514 of our men and women—69%—are now Payroll Savers. Every new employee is given a Payroll Savings Application Blank and an opportunity to join with his fellow workers

in building personal security through systematic thrift.

“We believe The Payroll Savings Plan—with an enrollment of 8,000,000 employees of more than 40,000 companies—is a significant contribution to the Government’s effort to check inflation and maintain a sound dollar.”

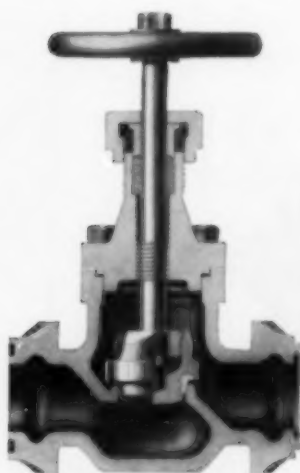
CLYDE E. WEED, President
The Anaconda Company

Why not take a *personal* interest in *your* Payroll Savings Plan? Your State Director will be glad to show you how to install the Payroll Savings Plan or revitalize an existing plan. Phone, wire or write, today, to Savings Bond Division, U. S. Treasury Department, Washington, D. C.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

SOUTHERN POWER & INDUSTRY





Frick valves have high-angle seats and oversized stems, are good for various high-pressure jobs.



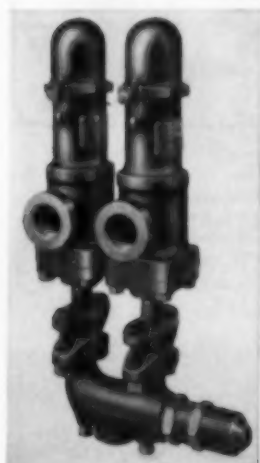
Time-tested Valves and Fittings

Are preferred for cooling systems using ammonia, Freon, or other refrigerants—as well as for high-pressure work in many industries. Full line of sizes, $\frac{1}{4}$ " through 14". Handle pressures of 300 to 1500 lbs., according to size. Flanged and screwed types, offering many exclusive advantages.

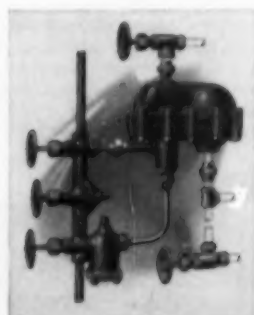
Stocked by Frick Distributors in principal cities, the world over. Write now, on your letterhead, for new loose-leaf catalog, which gives prices, weights, dimensions, parts lists, allowable pressures and useful tables.



Flanged angle valve having seal-cap, for use with Freon.



Two safety valves mounted above a dual-outlet valve.



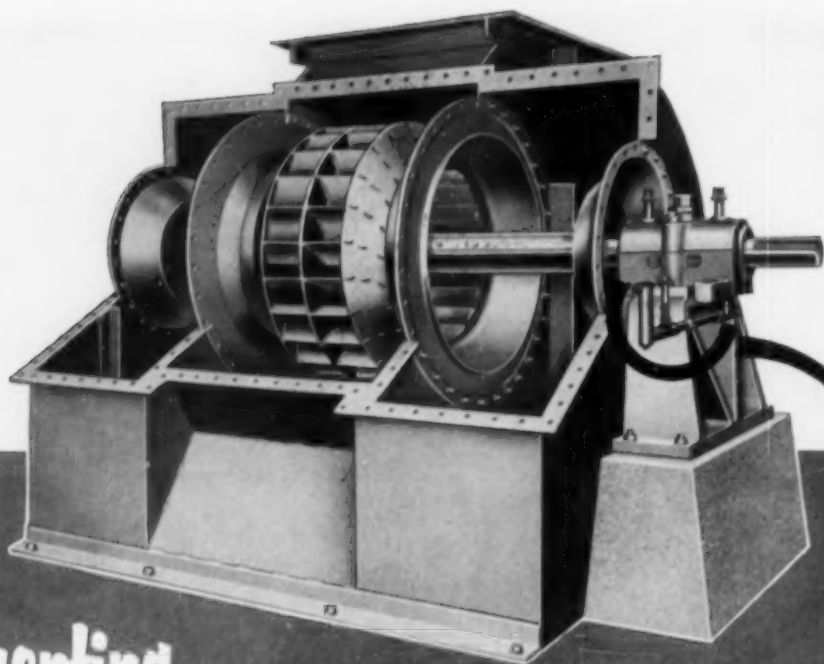
Float valve controls and bypasses, in a range of types and sizes.



Electric control valves, in sizes 1" to 2 $\frac{1}{2}$ ".



Get this new catalog by writing today.



Presenting... Another of the features distinguishing **CLARAGE MECHANICAL DRAFT FANS**

You get more than extra-heavy construction, extra-long service life from a Clarage Fan. You now get a vastly superior oiling arrangement for the bearings — as shown on the right.

Send for Catalog 901-A describing the Clarage Type RT Fan and the many features that have made it the stand-out performer in forced and induced draft service. **CLARAGE FAN COMPANY**, Kalamazoo, Michigan.



Designed to simplify maintenance, this Clarage Oiler provides for accurate remote oil level indication when fan is running or not running . . . simplified oil level adjustment . . . quick filling . . . automatic overflow to prevent overfilling . . . cleanliness due to improved shaft seal effectiveness and use of overflow cup.

CLARAGE

*... dependable equipment for
making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

**"I got 5 years of
service from a valve
I expected to last
only 90 days"**

Mr. C. L. Worthington, Chief Engineer for E. L. Bruce Co., Little Rock, Arkansas plant, standing near a Walworth No. 225P Bronze Globe Valve with "500 Brinell" stainless steel seats and discs that was installed in severe boiler blowdown service. Hardened seats and discs are especially resistant to wire drawing, steam cutting, or galling.



Some time ago Mr. C. L. Worthington, Chief Engineer for E. L. Bruce Co. plant at Little Rock, Arkansas, was having valve trouble on some newly installed boilers. The first boiler to go in service generated 600 hp operating at 200-pounds pressure. The water was so bad that a hot lime and soda ash water softener treatment had to be used, and it was necessary to add other chemicals to this solution from time to time. Mr. Worthington wanted to use a continuous blowdown to skim off the worst part of the scum on the water. He installed a small blow pipe about an inch below the normal water level in the boiler. This worked well, except that the one-inch valve on the line

could only be partially opened and let a small part of the scum be blown off at one time. If the valve was widely opened, it would not take long to lower the water level in the boiler and run the steam pressure down. This service gave Mr. Worthington lots of valve trouble, as can well be imagined, because of the extreme wire drawing that occurred.

One day the Walworth representatives in that area, called upon Mr. Worthington and demonstrated the outstanding features of the Walworth No. 225P Bronze Globe Valve. This valve, which has a working steam pressure rating of 350-pounds at 550°F, has a plug-type stainless steel seat and disc which has been heat treated to a minimum hardness of 500 Brinell. After listening to the Walworth men and examining a 225P valve, Mr. Worthington agreed that he would try one in the severe service described. He said if it lasted 90 days, he would consider that it had done a good job.

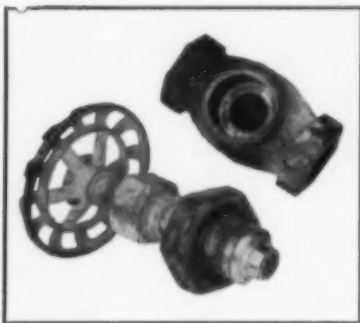
The valve went into service and came out within three days of being in service five years under very severe operating conditions. The valve was used 24 hours a day from early in the morning on Monday until Saturday night, when it was closed until the following Monday morning. It was never opened more than three-quarters of a turn, and

most of the time it was opened only one-half to one-quarter of a turn. For the life of the valve, nearly five years, it never failed to give a 100% closure when shut on Saturday night until opened Monday morning.

When another 600 hp 200-pound pressure boiler went into service, it also was equipped with a one-inch Walworth No. 225P Bronze Globe Valve on the same service.

In view of the severe service and the wire drawing to which this valve was subjected, it is interesting to note that the original valve (which was taken out of service almost five years after it had been installed) was removed — not because the seat and disc were wire drawn — but because the turbulence of the steam had finally caused a small hole to occur in the wall of the body of the valve. Needless to say, the valve that was taken out of service was replaced immediately by another one-inch Walworth No. 225P Bronze Globe Valve, positive assurance that Mr. Worthington is satisfied that this valve has "done a good job."


Other Walworth products include complete lines of Gate, Globe, Angle, Check and Lubricated Plug Valves in bronze, iron, steel, stainless steel and special alloys. Complete information and literature will be furnished upon request.



A Walworth No. 225P Bronze Globe Valve that gave perfect performance for four years and 362 days in a severe boiler blowdown service where the Chief Engineer said he had never been able to keep a valve more than 90 to 90 days.

WALWORTH

60 East 42nd Street, New York 17, New York

SUBSIDIARIES:  ALLOY STEEL PRODUCTS CO.



CONOFLOW CORPORATION



M & H VALVE & FITTINGS CO.



SOUTHWEST FABRICATING & WELDING CO., INC.



WALWORTH COMPANY OF CANADA, LTD.

Write your own specifications:

VOLATILITY
B.T.U.'s
SIZE
ASH
MOISTURE
SULPHUR
A.S.T.

... the modern, efficient mines
on the C&O can produce
just what you want.



For dependable deliveries of top quality coals, contact coal producers on the C&O. And if you need help in meeting your own particular fuel requirements, write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake & Ohio Railway Company, Terminal Tower, Cleveland 1, Ohio.

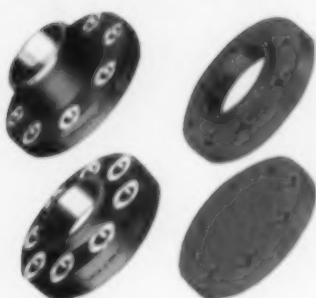


Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL



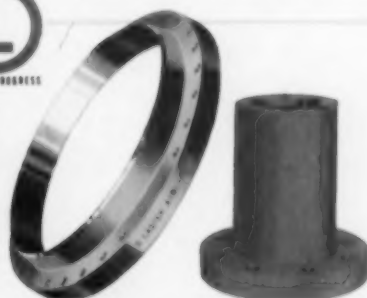
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(IP5)**



ASA and MSS FLANGES



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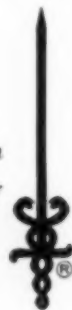


alive today! ... like 400,000 other Americans cured of cancer
who went to their doctors in time

Let's give our doctors a chance. Thousands of Americans are being cured of cancer every year. But too many are losing their lives needlessly because they failed to consult their doctors when the disease was in its early ... and therefore more curable ... stage.

Form the life-saving habit of a head-to-toe physical checkup once a year. For men, this should include a chest x-ray; for women, a pelvic examination. Make it a habit ... for life.

*American
 Cancer Society*

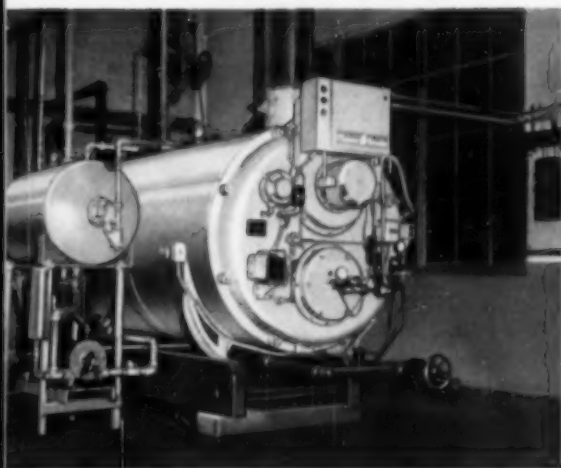


One of America's largest and leading
dairy associations uses

69 CLEAVER-BROOKS BOILERS

SEE OUR EXHIBIT
BOOTH NOS. 648-650
INTERNATIONAL HEATING &
AIR CONDITIONING EXPOSITION
CHICAGO
FEB. 25 — MARCH 1

Location of Cleaver-Brooks
boilers in League plants.
Dairymen's League facilities
include 70 country plants, 24 city
branches, 6 ice cream plants
and 9 manufacturing plants



MILTON, PA. — This country plant is supplied with quick, dry steam from a Cleaver-Brooks 60 hp light-oil fired CB boiler.



"Our 69 Cleaver-Brooks boilers are a key part of our production — their unusually high efficiency, sanitary, clean operation have helped us grow and prosper", says Ken Dodge, staff engineer for Dairymen's League Cooperative Association.

"Maintenance is low. We average far less than one service call per boiler per year," he adds.

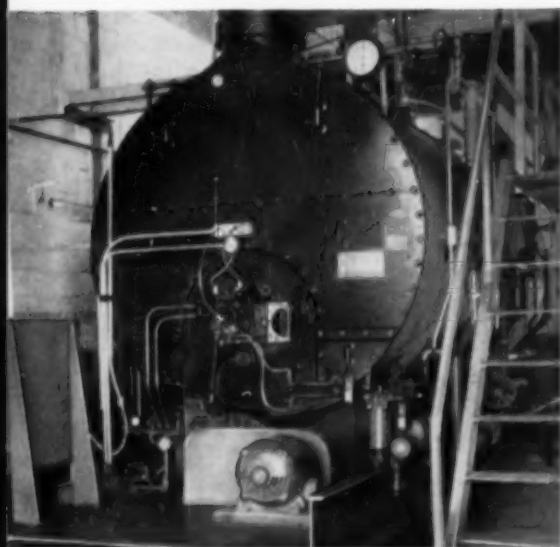
Dairymen's League Cooperative Association, serving 25,000 dairy farmers and thousands of consumers in New York, Pennsylvania and New Jersey, has been a steady user of Cleaver-Brooks boilers for 20 years.

Like any dairy company, the League finds steam essential for the production of quality dairy products. Their boilers are the work horses of their plants — supplying steam for pasteurizing, heating, cleaning and processing.

And Cleaver-Brooks boilers, with their exclusive four-pass, forced draft design and clean, quiet operation are especially suited to dairy plant operation.

Famous dairies the country over are profiting with the many advantages of Cleaver-Brooks boilers, available in a complete line. You can select from 110 models in 18 boiler sizes, 15 through 600 hp ... oil, gas and combination oil and gas fired.

For more information contact your nearby Cleaver-Brooks representative. Or write Cleaver-Brooks Company, Dept. A, 305 E. Keefe Avenue, Milwaukee 12, Wis. Cable Address: CLEBRO — Milwaukee — all codes.



UTICA, N.Y. — In this city plant a 250 hp LR heavy-oil fired boiler provides all steam for pasteurizing, cleaning, heating and processing.

Cleaver  Brooks

ORIGINATORS OF THE SELF-CONTAINED BOILER

TURN ON PERFORMANCE
...Turn off your Costs!



CHAPMAN LIST 960

Forged Steel Gate Valves

This is an open and shut case of top performance and lowest maintenance. To begin with, the wedge faces on Chapman List 960 are *super* hard. In fact, they're hardened to 800 Brinell by Chapman's *exclusive* *Malcomizing* process. They can't seize. They can't gall. The seat rings are hardened stainless steel. They last longer and, when necessary, they're very easy to replace.

There are no full-pressure repacking difficulties. Bolted follower on the outside screw rising stem design has no threads that are exposed.

Is it any wonder there are more Chapman List 960 valves on more jobs than any other small forged steel gate valve? They stand up perfectly under conditions ranging from 380 psi at 1000°F to 2000 psi at 100°F. You use Chapman List 990 valves for higher pressures. Sizes for List 960 are from 1/4" to 2". You can have rising stem with yoke or rising stem with inside screw. And the Bonnet joint is either gasketed or ground metal-to-metal, depending upon your needs.

To take a good look at the ways to cut your valve costs, take a good look at our Catalog 10. Write, today, for your copy.

The
CHAPMAN
VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASS.

INDUSTRY SPEAKS



Engineers Can Rise and Shine

WHO CAN SAY when engineers are wasting time? Certainly at the recent ASME meeting and Power Show in New York many of the nation's engineering "top hats" could be seen delving deeply into things that are too new to affect their operations for some time to come.

BUT SHOULD those responsible only for conventional power plants put on blinders to avoid learning something about atomic power? We think not.

SHOULD a paper mill engineer walk right by an exhibit staged for textile men? Again, no!

SCARCE as engineers are, should they stay at home, run their jobs and ignore such activities completely? The answer is still no.

Engineers are by their very nature and experience an inquisitive group. Good engineers simply will not "mind their own business." That is why they are hired in the first place — to bring new vision to commonplace problems. Those that are satisfied with routine soon turn into operators, or supervisors or foremen — and sometimes department store proprietors or even clerks.

TOO FEW ENGINEERS? Yes! Or at any rate there are too few doing engineering work. Everybody wants to know what to do about it.

The basic answer doesn't seem too hard to find. We have got to make more smart people become engineers. That can be accomplished by incentive — not just starting salary, but ultimate goal. Build up prestige so that 20-years-out-of-college the engineer will stand face to face, on equal terms, with top professional men, and a good start will have been made.

Then too, a lot of people that employ engineers don't need them in the first place and don't know what to do with them after they get them.

A lot of sales engineers need only to be good salesmen, and a lot of good engineers in the industry are doing work that could be done as well or better by technicians or non-professionals.

CRITICIZE the colleges if you want to, but they are going to do what is expected. Demand better performance and it will be forthcoming. But industry should help.

STATISTICS are available by the bucketful.

The latest report, *A Study of the Scientific Manpower Problem of the United States* by B. F. Goodrich Company, is one of the best compilations of facts and figures.

"America will need within 10 years nearly 100,000 more scientists and engineers than current training trends indicate we will have.

"A shortage could be avoided if just 20 to 30 more students out of each 1,000 graduates attained degrees in science and engineering.

"This could be accomplished if a relatively few more students who had not planned to enter college enrolled in science and engineering and if the high percentage of college failures among science and engineering students could be reduced without lowering academic standards."

Mr. Collyer, Chairman of Goodrich, made the above remarks in a release recommending the study for serious consideration.

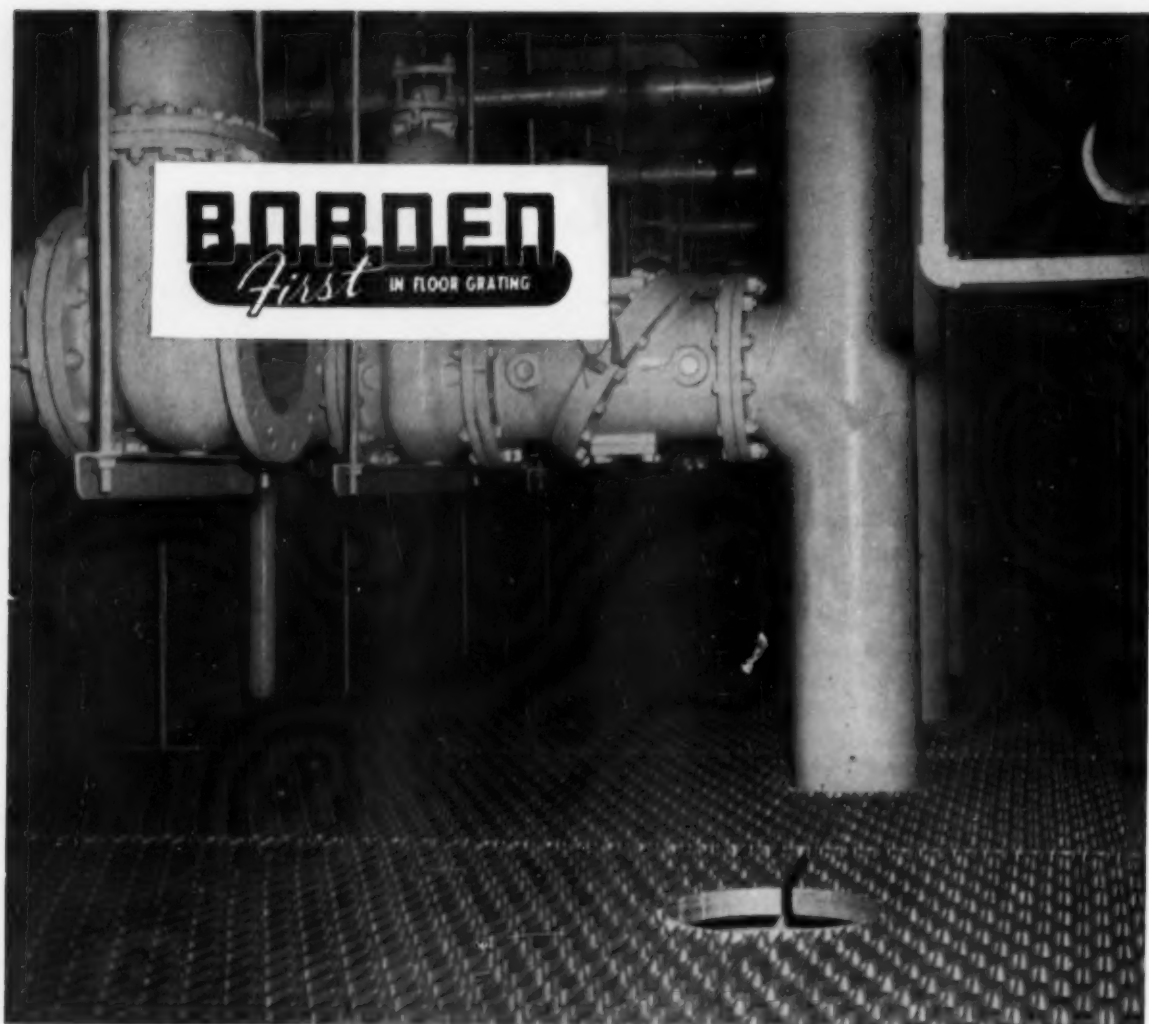
The study is designed to provide information upon which the extent of our scientific manpower needs may be gauged and to suggest possible areas of action for meeting the needs. Estimates in the study are based on projections of the growth of the nation's population, industry and education. Copies of the 28-page study are being sent to leading industrialists.

Those interested in helping to relieve the shortage should read the report.

The problem must be solved by raising professional standing of the engineer, and that is a job for existing engineers. They have never had a better opportunity. Right now is the time for engineers to stand squarely on their own feet and look the world in the face. They are important. They are needed. There is even a little aurora of romance about them. Can they stand the test? Will they rise and shine?

P.S.—The morning after

If a boy really wants to be a lawyer or a doctor, or even a bandit, all the gold in Fort Knox will not make an engineer out of him. But perhaps we can make more really want to be engineers and then make them proud of their profession. A feature article in this issue, *The Engineer and Public Relations*, tells how it can be done.



BORDEN MANUFACTURES EVERY TYPE FLOOR GRATING

IN STEEL, STAINLESS ALLOYS AND ALUMINUM

- **EASY TO INSTALL** — engineered in conveniently sized units for easy installation.
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INDUSTRY SPEAKS

SOUTHERN POWER
AND INDUSTRY

Better Power-Transmission Products

GEORGE A. JAGGERS, president of the FORT WORTH STEEL & MACHINERY COMPANY, Fort Worth, Texas, addressed the recent Sea Island, Georgia, annual joint meeting of the Multiple V-Belt Drive & Mechanical Power Transmission Association and the V-Belt Subdivision of the Rubber Manufacturers Association.

SPEAKING on the subject — Design for the Future — Mr. Jagers pointed to economists' predictions of a gross national product of 550 billion dollars in 1965 — a 36% increase over the 408.3 billions estimated for 1956. Jagers added that industrial history indicates that the future of manufacturers of mechanical power-transmission products "is related directly to this forecasted growth, and we find no factors which would cause us to believe otherwise."

"However, when we speak of a specific industry, and the relationship of its future to that projected for our country, we cannot over emphasize the importance of giving full consideration to potential **technological developments**.

"We never know from what source we may find technological improvements which will encroach upon our markets or even obsolete our products, such has happened or is happening to the buggy whip, the milk bottle, the ice box, the steam locomotive, and railway passenger traffic.

"**There is no corner on ideas.** Smaller firms have just as much access to them as their bigger rivals. Research holds equal opportunity for all companies, and there is no area in which the advantage clearly lies with either the small or large company. In fact, the smaller company may enjoy a decided advantage in the vast field of inspiration.

"We have some new developments in our field which have not been particularly spectacular but which may gradually broaden their acceptance to the point that they could substantially influence the future plans of our industry. Among these we find the **Timing** and the **Poly V drives**. Examination of these drives by competent authorities reveals certain features and advantages which command a full measure of regard as to their future development and market acceptance.

"In addition, there has been in the past few years a definite increase in equipment designed to use **direct coupling**.

"When considering these factors, along with the premise that a large portion of our business in the past 25 years has come from the conversion and replacement of existing drives, there is an apparent need for an aggressive program to maintain our growth. Certainly with all new equipment manufactured in the past 10 to 15 years having had V-belt drives furnished, we may anticipate that the **era of conversion has passed** and that this segment of our market must either be re-established with further technological development or compensated for in wider acceptance of the V-belt principles for new machinery being constructed. We, of course, have an active market resulting from changing ratios which we may expect to continue as industry progresses in the field of improved methods of manufacturing.

"The developments in V-belts in the past 10 years and those pending for the future, exemplify the determination to build ever better products. Likewise, developments in the **sheave industry** such as QD, Taper-Lock, and Magic-Grip construction and the improvement in materials and designs, equally exhibit such determination. Much of this progress in our industries has been carried forward, one independently of the other. This situation has imposed certain hardships which we believe neither should be required to bear. I know not of any related industries where one is more dependent upon the other than that which exists in the V-belt and sheave industries.

"For this reason alone, it appears logical that the various members of our industry should continue to work in harmony toward improved designs and improved quality of products. From these efforts, much good has come to our various companies and to American industry.

"A free exchange of ideas between the belt and sheave manufacturers with a view toward developing more efficient drives, perhaps even abandoning the principle of the V-belt drive, may provide the fertile soil from which will germinate our designs for the future."



Central power for large South Carolina textile mill

New Plant Rather Than Addition

A MODERN, efficient and serviceable industrial power plant . . .
 pressurized furnace . . . cyclone firing system . . . pneumatic
 combustion control . . . minimum of operators . . . has more than
 met design requirements . . . efficiency around 90% or better . . .
 net plant heat rate around 11,500 Btu and will undoubtedly be
 improved.

By W. L. BROSS

Chief Engineer
 Greenwood Mills
 Greenwood, S. C.

THE NEW Mathews No. 2 Power

Plant is located about equidistant between our Mathews Textile Mill and our new Durst Cotton Mill — distance to either mill from the plant being about a quarter mile.

When it became evident some years ago that our existing 20,000 kw steam power plant was inadequate to handle any future load growth, our engineering department began a study of size and types of equipment that should be installed. Originally all study was based on an addition to the existing power plant, but our management soon saw the extremely crowded conditions that would result, also the many interferences with existing equipment and possible long periods of shut down of the old plant to enable installation of a new power unit.

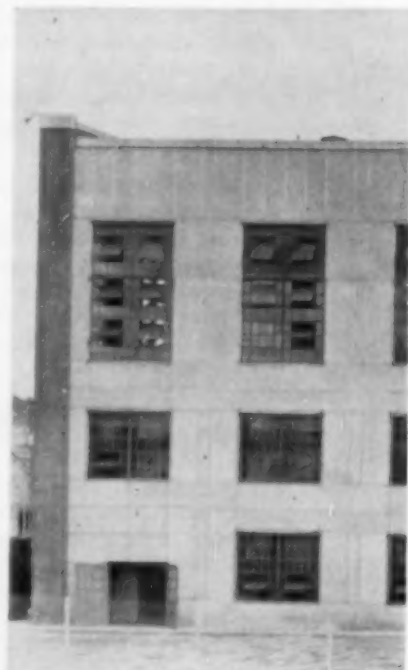
After some study of several plant sites, a location was chosen

as most suitable from the viewpoint of adequate building area, proximity to load center and nearness to old power plant, and ability to economically furnish process steam for two of our largest textile plants.

General Plan

While the final study on plant site was being made, decision on equipment specification and purchase was going forward. Design on power plant structure was also being carried on. The power plant as finally laid out consists of four basic structural units.

The turbine house with its turbo generator, condenser, condensate pumps, station service switchgear, low voltage dry type transformer for medium and small motor drives, station service switchgear and panel board control for turbo unit and high voltage outdoor switchgear is in a conven-



tional brick and steel building.

The second and third elements of the structure are of outdoor type construction without roof or siding. These accommodate the stage heaters, evaporator, boiler feed pumps, make up and service pumps and condensate storage tank; also the boiler with its air heater, control drives and forced draft fan.

The fourth unit, which is the coal storage bunker is of steel

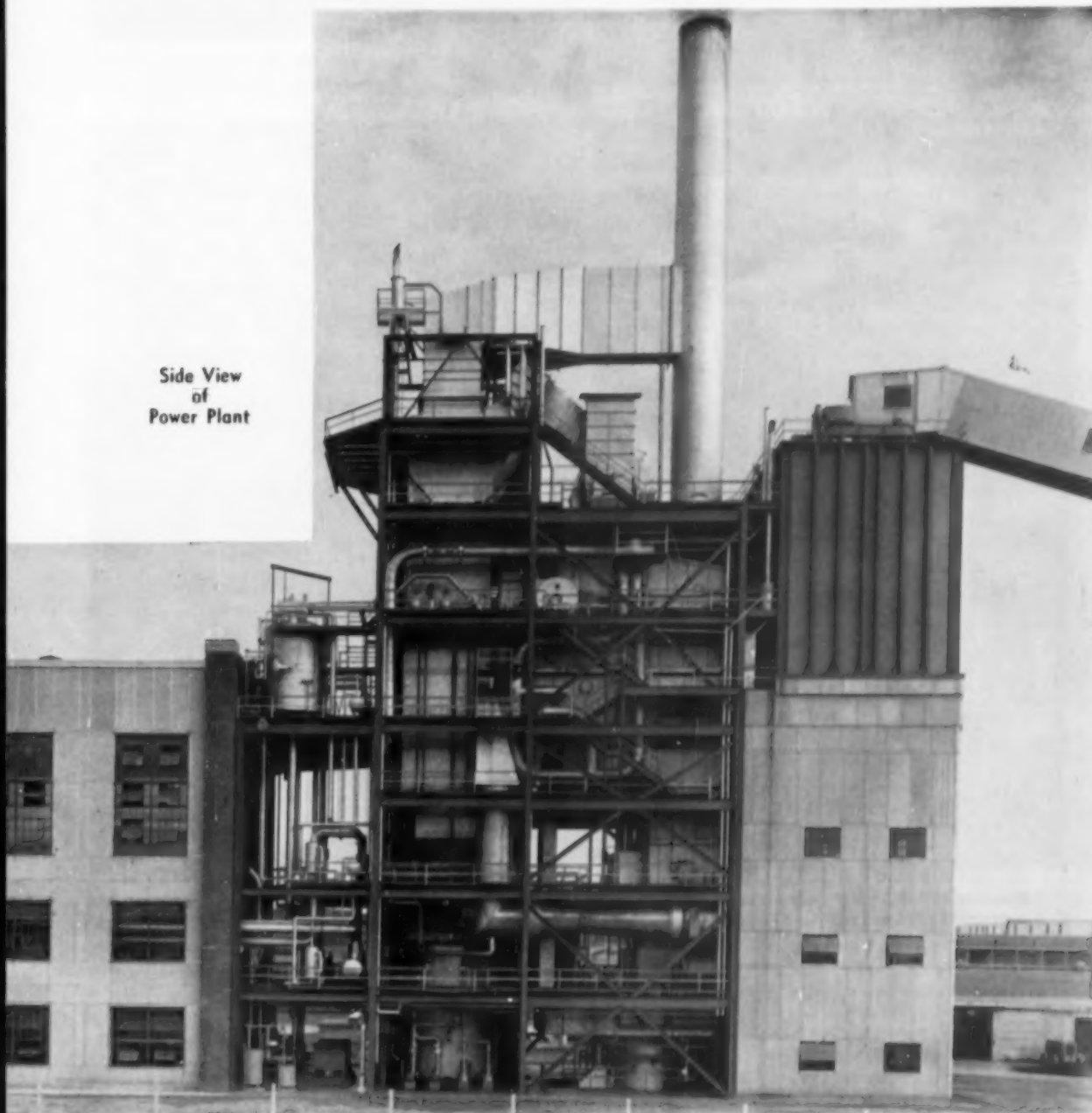
shapes and plates throughout. Total height of this unit above ground level is 92 feet. Dimensions of the coal storage bunker section is 44' x 24' x 33' high on the vertical wall sections, with two 22' x 20' x 15' hoppers spouting coal to the two feeder conveyors.

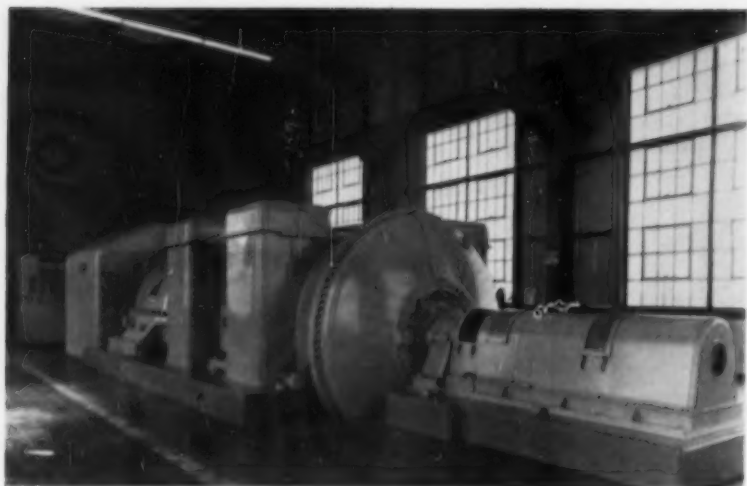
Space under the bunkers proper on the feeder conveyor level is floored over with checkered plate. The next level beneath this is the

firing control floor. The boiler control panel is located here, with glass enclosure toward burners.

The next level below the firing control room, which is ground level, is used for installation of two aspirating air compressors, two control air compressors, control air moisture removal equipment, two main fuel oil pumps and two small fuel oil pumps for lighting off.

Side View
of
Power Plant





Turbine is designed for steam conditions of 850 lb and 900 F at the throttle.

Three sides of the coal bunker structure beneath the vertical steel coal storage section are housed in with corrugated asbestos siding. The fourth side which joins on to the boiler structure is open except on the ground floor. A 12-in. brick wall is used here to close off the pump and compressor area from outside weather conditions.

Cooling Water

Since our plant was to be located in an area away from a source of ready water for condenser cooling, it was necessary to provide either a spray cooling pond of excessive size or, go to a cooling tower. An induced draft cooling tower was selected for this purpose, with adequate capacity to

take care of future overload conditions on our plant.

Fuel Burning

The steam generating unit selected after some study of our load trends was predicated on maximum efficiency, cleanliness of atmosphere, and ability to burn some of the lower grade, low fusion coals available from the Southwest Virginia and Eastern Kentucky mines.

Selection was made of a Cyclone fired unit, with full pressurized furnace, with capacity of 300,000 lb steam per hour at 875 psig and 900 F total temperature. Boiler design pressure is 1025 psig, with a maximum continuous capability of 350,000 lb per hour.

The boiler is equipped with two 7 foot cyclones, burning low to medium fusion coals sized from $\frac{1}{4}$ " down with a high percentage of fines below the top size of $\frac{1}{4}$ ".

The air heater was made over-size to furnish combustion air at 650 to 700 F to enable unit to utilize a wide range of coals. Cyclones were equipped with automatic oil fired igniters and furnished with auxiliary oil burners to carry full boiler load in

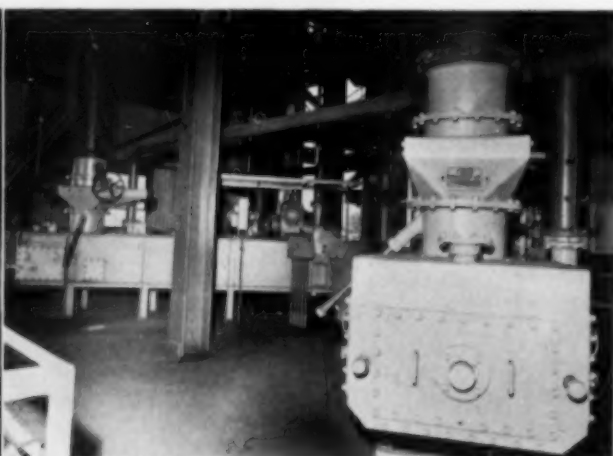
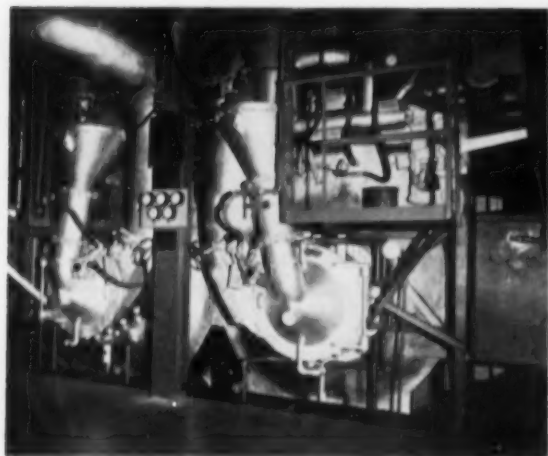
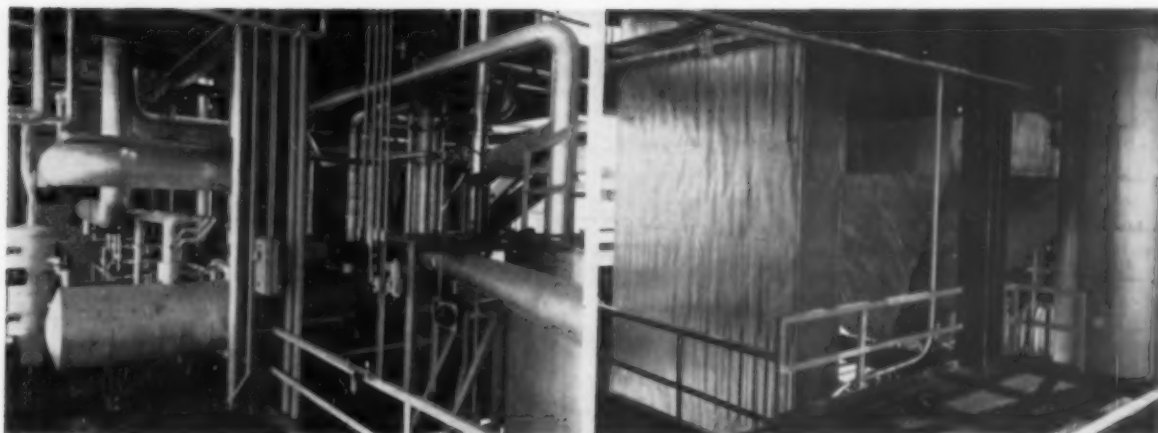


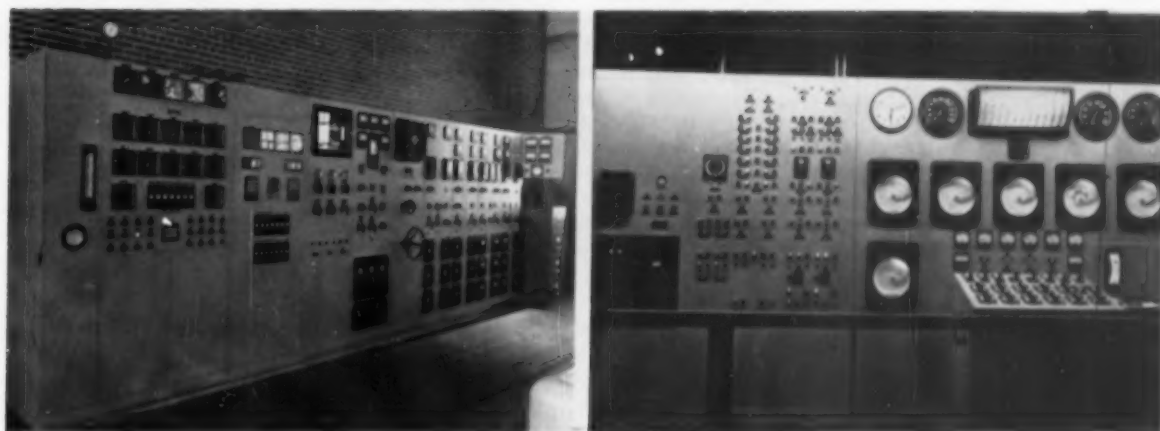
Photo at left shows the cyclone fuel feeders. View at the right shows method of delivering coal from bunkers to cyclones.

COAL crushed to $\frac{1}{4}$ " x 0" size is stored in the 800 ton storage bunker. Coal flows by gravity from the bunker through the Stock coal valves and onto the two 18" apron conveyors, driven by Louis Allis Adjusto Speed Motors — speed being varied by the automatic combustion control system. The apron conveyors discharge directly to coal pipes that enter the

vortex of each cyclone where the coal is mixed with the primary air. The primary air gives the coal air mixture a whirling motion. This mixture is thrown out into the cyclone burner section where the secondary air is admitted at high velocity. Complete combustion takes place in this highly turbulent cyclone area.



Aluminum jacketing was used extensively. Jacketing on heaters and piping is shown in the left photo and (at the right) over insulation on air duct, air heater and dust hopper.



Modern control panels — turbine-generator panel at the left and boiler panel (right) behind glass enclosure.

case of failure to coal feeding equipment. Gas can also be utilized if available. Fuel oil storage capacity of 60,000 gallons has been provided along with the necessary unloading, and pumping facilities.

The forced draft fan and 75 foot smokestack are based on a concrete slab at the top of the boiler structure.

Turbo Generator Unit

The turbine generator is a 32,500 kw unit with throttle conditions of 850 psig and 900 F. An overhead crane of 50 tons capacity is installed over the turbine room for installation and overhaul purposes.

The generator is a hydrogen cooled 13.8 kv, 3 phase 60 cycle, .80 pf, 40,600 kva machine tied into the outdoor 13.8 kv switchyard

through enclosed overhead bus duct and generator oil breaker. The switch yard being equipped with feeder breakers and step-up transformers serving the various transmission lines to our textile mills and to a tie line with the nearby Greenwood County Power Commission distribution station.

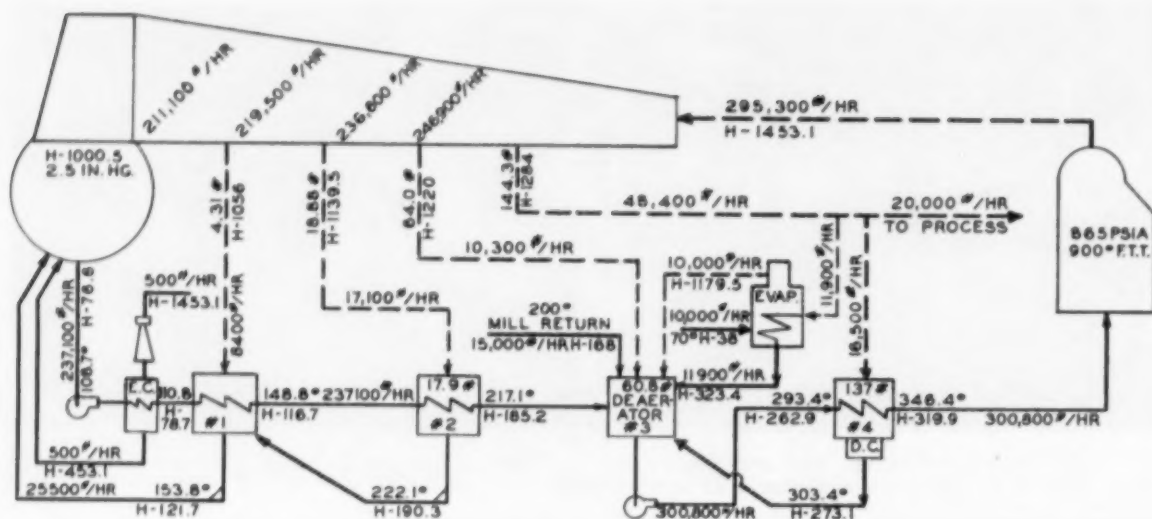
Design, construction, and installation of equipment was by our own engineering and construction departments. General consultant was Frank Hill of Greenville who brought in W. E. Nickles to assist in electrical layouts.

The plant as a whole has more than met its design requirements, both as to ease and reliability of operation and expected efficiencies. Preliminary figures show a net plant Heat Rate of around 11,500 Btu which we believe can be

somewhat improved as we get all equipment operating at top efficiencies.

Boiler

The boiler unit is a Babcock & Wilcox pressurized furnace, two drum Sterling type. Design pressure is 1025 lb per sq in. Normal operating pressure at superheater outlet is 875 lb gauge. Capacity is 300,000 lb per hour. Superheater is of the pendant type with primary and secondary sections and is designed to deliver 325,000 lb steam per hour at 875 lb gauge and 900 F temperature. Temperature control of final steam is by means of a three element Bailey control bypassing steam through a mud drum attemperator. Temperature control under full steam flow is plus or minus 10 F of the



Flow diagram showing heat balance of plant.

design temperature of 900 F.

The boiler is equipped with two 7 foot cyclones, receiving coal from two apron type conveyors which are driven by Louis Allis Adjusto Speed motors with a 10 to 1 speed range. The cyclones tap molten slag into a common primary furnace, which in turn taps into a Beaumont Birch slag tank.

Firing

Coal ($\frac{1}{4}$ " x 0") is fed to the vortex of each cyclone by an 18" apron type conveyor driven by variable speed units controlled by the automatic combustion control system. Coal is prepared for storage to bunkers and firing to cyclones by means of a 100 ton per hour Pennsylvania hammer type crusher, which reduces the coal to a maximum size of $\frac{1}{4}$ " with a high percentage of fines.

Both coal quantity and secondary air quantity are regulated by the combustion control system. Air for combustion is heated by a 70,000 sq ft B&W tubular air heater to a temperature of 700 F. Leaving gas temperature from the air heater at full steam load is 290 F to 300 F. Overall guarantee of combined efficiency is 88.66% or better. Actual operating experience shows an efficiency of around 90% or better.

Coal Handling

Coal is delivered to our unloading track in standard hopper bot-

tom cars. Cars are spotted over an unloading hopper at ground level. Coal is fed at the rate of 100 tons per hour from this track hopper by two reciprocating feeders to a 24" inclined belt which conveys the coal to the top of the crusher house.

From this point it is fed either to storage by an inclined chute to the outdoors storage pile or to the 100 ton per hour Pennsylvania crusher. From this crusher, the coal spouts by gravity to another 24" inclined conveyor belt 328 feet long which elevates the coal about 100 feet to the top of the coal bunker where a run around drag type conveyor distributes the coal to the 800 ton storage bunker.

Coal is stocked out to the storage yard by bulldozer, and reclaimed by the same means to a ground level reclaim hopper. Coal is fed from this hopper by a reciprocating feeder to a 24" inclined belt which conveys to the crusher. From there the coal takes the same path to live storage bunkers as above outlined. All coal going to storage bunkers is weighed by a Merrick automatic continuous Weightometer.

Fans

The boiler is served by a single forced draft fan. No induced draft fan is necessary since this is a pressurized furnace installation. This is actually a double width, double inlet Sturdevant, centrif-

ugal compressor, designed to deliver 94,000 cfm of air at a static pressure of 55.8 inches, with a horsepower input of 1160. The fan is driven at 1750 rpm by two 600 hp — 2300 volt direct connected squirrel cage motors with air delivery being controlled by damper regulation. For full load conditions both motors are utilized, but up to 60% of full load one motor is adequate.

Combustion Control

Much thought was given to the matter of combustion control, especially since the cyclone firing system was such a new and radical departure from our experience of coal firing. Careful consideration of different control systems included the Bailey pneumatic system. Having had considerable experience with the same general type of controls on a pulverized coal job, and also having found many cyclone fired units in the Midwest using this system successfully, we finally decided upon this system. It is a standard steam flow air flow master control system.

However, in this instance, another element of control was tied into the combustion control system — two oxygen analyzers, continuously sampling gas from each cyclone burner, making a chart record of the percent residual oxygen present, and furnishing a pneumatic impulse to the master control system to correct for opti-

$$\begin{aligned} 295,300 \times 1453.1 &= 429,110,430 \\ 500 \times 1453.1 &= 726,550 \\ 15,500 \times 168.0 &= 2,520,000 \\ 10,000 \times 38.0 &= 380,000 \end{aligned}$$

$$\begin{aligned} 432,736,980 \\ 121,304,320 \end{aligned}$$

$$311,432,660$$

$$\begin{aligned} 300,800 \times 317.9 &= 95,624,320 \\ 20,000 \times 1284 &= 25,680,000 \end{aligned}$$

$$121,304,320$$

$$\text{Btu/Kw} = 311,432,660 = 9578$$

$$32,513$$

mum combustion conditions in each cyclone furnace.

Feedwater make up for the plant is supplied from a 10,000 lb/hr, horizontal, submerged bundle thermal descaling evaporator. Feed to the evaporator is from city water mains, through a booster pump. Water has no previous softening or demineralization treatment.

Storage of evaporated make up water is in a 30,000 gallon steel tank mounted at ground level. Make up water to the deaerating heater and to desuperheating, as well as to cyclone vortex jacket cooling, is pumped from this tank as the cycle may require. This is shown in the schematic flow diagram.

Feedwater heating is by bled steam to two low pressure heaters, a deaerating heater and one high pressure stage heater. These are all horizontal tubular units placed on the intermediate platforms between the outdoor boiler unit and the turbo generator.

Feedwater regulation is by a three element Bailey feedwater control system. Feedwater pumps are Ingersoll-Rand, 9 stage, split casing pumps rated 700 gpm at 1050 psig. Two pumps are installed, each driven by a 600 hp, 3600 rpm, 2300 volt motor.

Turbo Generator

The turbo generator selected is a 32,500 kw, 40,600 kva unit operat-

ing at 13,800 volts, with hydrogen cooling. Hydrogen pressure under these design conditions is supposed to be 15 lb. Actually however, we have found that full rating of 32,500 kw can be obtained at a hydrogen pressure of one to five pounds, thus giving us a considerable overload leeway and also allowing us to operate at full load rating with negligible hydrogen losses.

The main exciter operating at 230 volts and the pilot exciter operating at 115 volts are direct connected to the unit.

The turbine is designed for steam conditions of 850 lb and 900 F at the throttle. Turbine operates at 3600 rpm. Speed regulations is by oil hydraulic system with hydraulic controlled multi valves controlling inlet steam to two impulse stages followed by 23 stages of reaction blading. There are 4 points of uncontrolled steam extraction for feedwater heating and one stage of controlled extraction for process steam to two of our nearby textile mills for heating and slashing purposes.

Condenser

The turbine exhausts to a two pass divided water box condenser with 25,000 sq ft of surface. Circulating water at the rate of 30,000 gpm is supplied by two 15,000 gpm, vertical, motor driven propeller type pumps installed in a concrete intake well in an outdoor location adjacent to the cooling tower. Water is circulated to and from the condenser through 48" welded steel underground pipe extending from the pumps at the cooling tower and returning to the top of the tower through 8 - 20" risers taking off the main return header.

Cooling Tower

The cooling tower is a Marley eight cell, double flow induced draft unit, using 8 - 22 foot fans driven by 50 hp motors through gear reducer units. The tower is designed to cool 30,000 gpm of water through a fifteen degree temperature rise to within five degrees of existing wet bulb temperature.

Since water is at a premium, every effort is made to conserve. All possible drips, compressor cool-

ing water, ash sluicing water, and the like is caught and used in our cooling tower or piped to our nearby large storage pond. From here it can be pumped back to our cooling pond basin. The only water losses are those due to evaporation in the cooling tower and the blow down from the tower and some small drips and leaks that cannot be economically returned.

Ash Handling

As outlined in the brief description of the boiler unit, ash is continuously tapped out of the cyclones into a common primary furnace, which in turn taps into a Beaumont Birch water filled quenching tank, where the slag is cooled and crystallized. When the tank becomes filled with slag, it is washed out through a 24" x 30" clinker grinder. A hydraulic jet then washes clinker to one of two settling basins where all solids settle out. Water flows from the settling basin over a wier to a large clear well where it is available for pumping throughout the hydraulic handling and the continuous slag tank water circulating system.

Water for the hydraulic slag handling system is furnished by two 1200 gpm, 100 psi Nagle manganese steel sluice type pumps. Water is circulated through the slag quenching tank by two Nagle, 300 gpm manganese steel pumps. Temperature of water in the quenching tank is not allowed to go over 120 F, and water discharged through the system flows through the settling basin and to the clear well. Enough surface contact is afforded to drop the temperature of this water within the range desired. Both slag sluicing pumps and the circulating water pumps are in duplicate and take their suction from the clear well section.

Settling basin areas are used alternately, each basin having sufficient storage capacity to accommodate the slag produced in three to four weeks of operation. Slag is removed from the basin, after it is dewatered, by means of a front end loader. Slag is hauled away in dump trucks and used for driveway surfacing and

for concrete cinder block aggregate. Many other uses for this product are under consideration.

Switchyard

Power from the plant goes to an outdoor 13.8 kv switchyard which ties into our existing distribution system, either through step up transformers or directly at 13.8 kv as is the case to our Mathews and Durst Plants. We also have a tie to the nearby Greenwood County Substation, and to the same system at our Ninety Six Mill, about 9 miles away. These tie lines are at 44,000 volts

and have a transformer exchange capability of 20 mva.

Station service for the power plant comes from a 3750 kva, 13,800 volt to 2400 volt transformer. All motors 150 hp and above are operated at 2300 volts. Smaller motors operate from a dry type 1000 kva, 2400 volt to 550 volt, three phase indoor transformer.

All 2300 volt station service switchgear is of the indoor metal-clad type with draw out air circuit breakers, all breakers are electrically operated. The 550 volt switchgear is also of the metal enclosed type with draw out air

circuit breakers. Most of these breakers are electrically operated, the only exceptions being several breakers feeding branch circuits for some of the smaller motors.

A great deal of detail has been given to supervisory relays, indicating lights and alarms on all equipment, and especially on auxiliary drives, motors, valves, and other remotely controlled units.

An attempt has been made as a whole to design and install a modern, efficient and trouble free industrial power plant, manned with the minimum of operators.

PRINCIPAL EQUIPMENT — Mathews No. 2 Power Plant, Greenwood, S. C.

GENERAL INFORMATION

Plant Location	South Greenwood, S. C.
Boiler Capacity	300,000 lb/hr
Generating Capacity	32,500 kw
Steam Pressure	850 lb gage
Steam Temperature	900 F
Design Engineers	Greenwood Mills
Consulting & Coordinating Engineer	Frank Hill
Construction Work	Greenwood Mills
Piping Contractors	Grinnell Co., Inc.
Insulating Contractors	Guy M. Beatty & Co.
Electrical Work	Greenwood Mills with W. E. Nickles assisting on layout

GENERATING UNIT

Turbine Generator	One—Brown Boveri Corp. 32,500 kw, 40,600 kva, 80 pf, 1750 amp, 13,800 volts, 5 lb H ₂ , 3 phase, 60 cy, 3600 rpm, 850 psig, 900 F
Exciter	Direct Connected, 130 kw, 230 volt
Pilot Exciter	Direct Connected, 3 kw, 115 volt
Generator Hydrogen Coolers	Four—Brown Boveri Corp.
Turbine Oil Coolers	One—Brown Boveri Corp.
Turbine Oil Filter	One—Honan-Crane Corp.
Condenser	Westinghouse 25,000 sq ft, two pass, divided water box
Condensate Pumps	Two — Westinghouse, vertical, pit type, 75 hp motor
Air Ejector	Two—Westinghouse, stage twin element
Circulating Pumps	Two—Vertical propeller type to handle 15,000 gpm each, motor driven
Hydrogen Purification	Unit—Brown Boveri Corp.
Hydrogen Oil Seal Cooler	Brown Boveri Corp.
Switchboard and Controls	Westinghouse Electric Corp.
Cooling Tower	Marley, 3 cell, double flow, induced draft

BOILER AND AUXILIARIES

Boiler	Babcock & Wilcox Co., two drum Sterling, 1025 psig design pressure, normal capacity 300,000 lb, hr, 875 psig at 900 F
Superheater	B&W Co., pendant with primary and secondary sections

Furnace	Cyclone fired, two seven foot cyclones
Soot Blowers	Diamond Power, retracting Type IK, with motor drives and automatic sequential control
Blow off Valves & Water Columns	Yarnall Waring Co.
Safety Valves	Consolidated
Coal Feeders	B&W Co., apron type with 10 to 1 ratio, Louis Allis Adjusto Spede drives
Combustion Controls	Bailey Meter Co.
Breeching & Stack	Babcock & Wilcox Co.
Steam Attenuator	B&W Co., submerged bundle type
Steam Temp. Controls	Bailey Meter Co.
Boiler Feed Pumps	Two—Ingersoll-Rand 9 stage, 700 gpm at 1050 psig, driven by 600 hp, 3600 rpm motors
Forced Draft Fan	One—Westinghouse, Sturdevant, centrifugal compressor to handle 94,000 cfm at 55.8 inches static pressure. Driven by two 600 hp 1750 rpm motors
Feedwater Regulator	Bailey, three element
Instruments	Bailey Meter Co.
Combustion Control Compressors	Two—Worthington, 100 cfm at 100 lb
Furnace Aspirating Air Compressors	Two—Joy Mfg. Co., 700 cfm, 100 lb
Fuel Oil Pumping Equipment	Two—Worthington, 50 gpm
Oil Unloading Pumps	Two—Worthington, 100 gpm
Coal Handling Equipment	Continental Gin Co., 100 ton per hour
Coal Crusher	One — Pennsylvania, reversible hammermill, 100 ton capacity

FEED WATER CYCLE

Low Pressure Stage Heaters	Two — Westinghouse Electric Corp.
High Pressure Stage Heaters	One — Westinghouse Electric Corp.
Deaerating Heater	One — Swartwout Co., 400,000 lb hr
Evaporator	One—Westinghouse, 10,000 lb hr
Make up Pumps	Two—Ingersoll-Rand, 300 gpm at 100 lb
Desuperheating Pumps	Two—Ingersoll-Rand, 30 gpm at 250 lb

ASH HANDLING

Slag Quenching Tank	Beaumont Birch Co.
Overflow Sealing Tank, Clinker Grinder and Hydraulic Ash Handling System	Beaumont Birch Co.
Ash Sluicing Pumps	Two—Nagle Pumps, Inc., man- ganese steel, 1200 gpm at 100 lb
Slag Tank Cooling Pumps	Two—Nagle, manganese steel, 300 gpm at 60 lb
Gland Seal Pumps	Two — Ingersoll-Rand, 30 gpm at 200 lb

MISCELLANEOUS EQUIPMENT

Power House Crane	Shaw-Box, 50 ton capacity
Piping, Steam Boiler & Turbine	Grinnell Co., Inc.
Piping, Circulating Water to Condenser	Greenwood Mills
High Pressure Steam Valves	Edward Valves, Inc.

High Pressure Water Valves	Wm. Powell Co.
Steam Reducing Valves	Spence Engineering Co.
De-Superheater	Schutte & Koerting
Pipe and Boiler Insulation	Guy M. Beaty Co.
Aluminum Jacketing (Air Heater & Piping)	Childers Mfg. Co.

ELECTRICAL EQUIPMENT

Switch Gear	Westinghouse Electric Corp.
Unit Substation	Westinghouse Electric Corp.
Station Service Transformers	Westinghouse Electric Corp.
Distribution Transformers	Westinghouse Electric Corp.
Switchyard Structure	Westinghouse Electric Corp.
Weather Protected Motors	Westinghouse Electric Corp., 2200v
Totally Enclosed Fan Cooled Motors	Westinghouse Electric Corp., 550v

New Equipment for Old Jobs

PRACTICAL application of modern materials handling has reduced costs at the Springs Cotton Mills' Southern plants. The Gayle Plant at Chester, South Carolina is typical of this trend towards increased production through modern methods.

Spring's operation at Chester posed several problems to Hyster Company engineers. Doorway clearances, ceiling heights and restricted aisles dictated the application of equipment specifically designed to operate under exacting conditions. For example, the Turretug pictured here is employed between the weaving and cloth rooms in the transporting of rolls of cloth. These trailers, when loaded, will gross about 3,500 lb.

Loaded trailers formerly requiring several strong men to push were always somewhat of a hazard from a control standpoint because of the danger of bumping and possibly damaging the looms. Towing problems such as these in relatively narrow aisles are a natural application for the Turretug as the maneuverability factor is of extreme importance. Steering is done through the drive wheel — the entire power unit can be completely rotated in either direction.

Turret Trucks "team up" ideally with all other materials handling systems or methods and at the Gayle plant particularly with their Hyster 2,000-lb capacity fork lift



Transporting rolls of cloth between the weaving and cloth rooms

Bales are transported through narrow passage ways from warehouse to opening rooms, negotiating steep ramps.



truck. Together, these units are performing multitudinous tasks like unloading of cotton bales, tex-

tile waste, storing of starch and warehousing of the finished products, rolls of cloth.

Air Impact Wrenches on the Job



BOLTING gangs, each 3-man crew equipped with an automatic Torque Control Air Impactool, have run approximately 40,000 high tensile steel $\frac{7}{8}$ -inch bolts in 40 working days at Allen Plant, major power plant construction project of the Duke Power Company. Although the crews are half the size of the normal 6-man riveting gang, the rate of production is double the riveters' speed.

Allen Plant, rising on the bank of the Catawba River near Belmont, North Carolina, is one of the largest construction projects underway in the South and is expected to be the largest steam generating station in the South Atlantic states when complete. The initial section, now being built at a cost of more than \$41,000,000, will house two 175,000 kw generating units. Plans call for later addition of three more units to bring total capacity to more than a million kilowatts.

This is part of Duke Power Company's long-range expansion program to anticipate the growing

power needs of the Piedmont Carolinas, a program that has seen the investment of more than \$320,000,000 since 1946. Allen Plant alone ultimately will cost more than \$100,000,000.

The Allen Plant project, like all the company's building jobs, is being handled by Duke's own construction division under the supervision of Construction Manager Charles T. Wanzer.

The 40,000 bolts in place, at the time this report was prepared, represent nearly a third of the 130,000 that will be required for the first section of the plant. Except for about 800 1-inch bolts, all are $\frac{7}{8}$ -inch high strength bolts installed with hardened washers and hexagonal nuts. All the $\frac{7}{8}$ -inch bolts are run with the new Size 5340T Ingersoll-Rand Torque Control Impactools. These air impact wrenches can be set to deliver any desired torque up to 500 ft-lb. They shut off automatically when they reach the preset torque.

At Allen Plant, the tools are set to produce a bolt tension in excess

of 37,000 lb, the minimum suggested by the Research Council on Riveted and Bolted Structural Joints for the calibration of wrenches. The two wrenches are checked each morning before starting work by running three or four bolts on a Skidmore-Wilhelm hydraulic calibrator which gives a direct reading on bolt tension. This procedure is followed not just as a check on the tools but to also determine whether any change in the bolts, nuts or washers being used necessitates a change in wrench torque to achieve the desired tension.

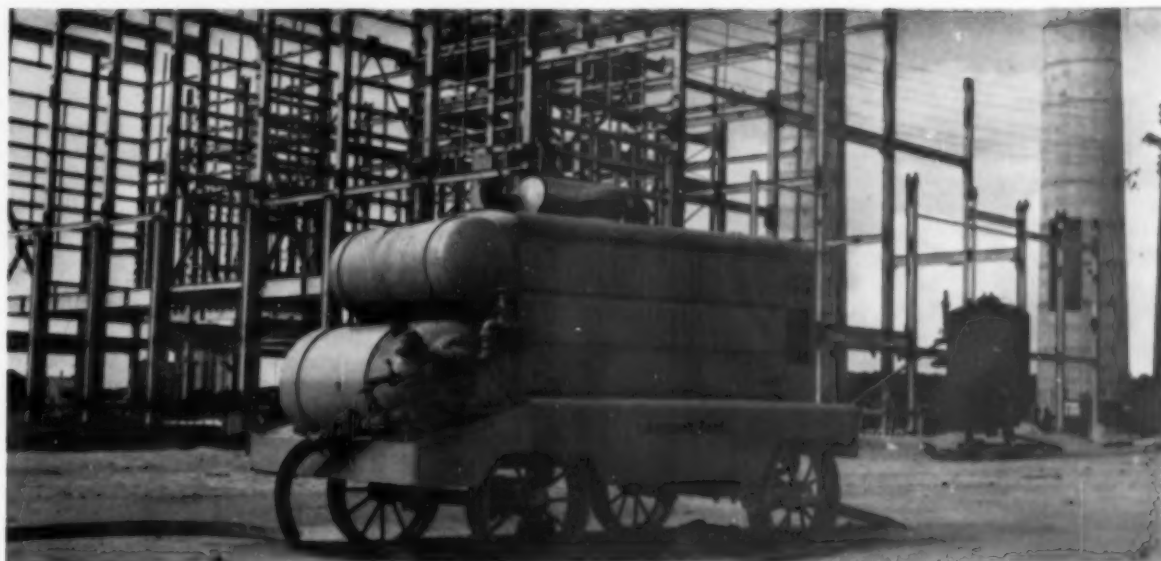
Erection Superintendent Tate Rust reports that it has not been necessary to alter the tool torque setting more than once a week. When a change is required, it is done in a few seconds on a simple jig by altering the twist in the torsion bar.

The standard Size 538 I-R Impactools used to run the 1-inch bolts also are checked on the calibrator, but in this case the tool operator runs a group of bolts and times the impacting needed to get the required tension. Then he seeks to duplicate this timing on each bolt he runs on the job. With the Torque Control Impactool, he just puts the tool on the nut and runs it till the wrench shuts off automatically.

The standard Size 538 I-R Impactools used to run the 1-inch bolts also are checked on the calibrator, but in this case the tool operator runs a group of bolts and times the impacting needed to get the required tension. Then he seeks to duplicate this timing on each bolt he runs on the job. With the Torque Control Impactool, he just puts the tool on the nut and runs it till the wrench shuts off automatically.

Bolting Procedure

Erection of the steel columns



When the first section of Allen Plant is complete, this compressor will have supplied air for the tightening of 130,000 bolts.

was begun on April 18 and the bolting began about a month later. When possible, the erectors were given the right length high tensile bolts to use in fitting up the steel. These were left in as part of the permanent installation. The bolting gang of two operators and a helper follow and install the remaining high strength bolts, putting the wrench on the fitting up bolts also to bring them to required tension. If the proper high strength bolts

were not available to the erectors, the bolting crew removes the fitting up bolts and replaces them with high strength bolts.

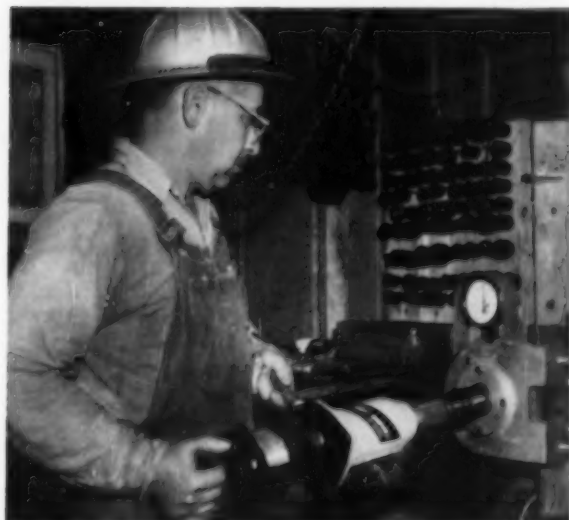
Working up in the air, with scaffolding to hang and move frequently, the 3-man team with its single Impactool averaged better than 400 bolts a day. When the gang worked on the mezzanine floor, with no scaffolding to bother with, the men could run 40 bolts on a beam and move right on to the

next beam. Here the new torque control tool had a chance to show its speed. Under these conditions, on a time trial, one crew put in 200 bolts in 20 minutes flat, an average of 10 bolts a minute. In part, this was possible because the operator could run the tool at full speed, keeping it on the nut the precise number of seconds needed because the tool shut off the instant it reached the preset torque.

Averaging work in the air and

Wrenches are checked each day by running bolts on a Skidmore-Wilhelm hydraulic calibrator. Tools at Allen Plant are set for 37,000 lb bolt tension.

Crews have run 200 bolts in 20 minutes when working on the mezzanine floor, and even up in the air, each gang averages 400 bolts a day.



on the floor, the two gangs have run about 1,000 bolts a day, a total of around 40,000 for the 40 working days. The rate achieved is roughly double what riveting gangs twice the size normally produce. It is possible that even more bolts might have been run had not the steel shortage reduced the pressure for production.

Bolting Crews

Duke Power has built a skilled construction team and holds its men year after year, moving them from job to job as the company continues to expand. With the switch to bolted construction, each former riveting gang was broken into two bolting crews.

With skilled, long-term employees, the company depended

on the men for quality control and it was customary for the iron workers to inspect their work as they went along. With the advent of the new impact wrenches, company engineers and the operators on the job have learned to depend on the tools to insure adequate bolt tension and inspection is limited to checking calibration of the tool each morning.

Experience on the Allen Plant project indicates that the Torque Control Impacttool is not only faster but more consistently accurate than the conventional impact wrench used on the 1-inch bolts. With the latter, Ralph Miller, in charge of bolting, reports that operators sometimes let the tool impact too long and stripped the threads. It is possible, of course,

that some bolts were not run tight enough, but the tendency is to err on the high side. With the automatic torque control tool, there have been no stripped threads and, since this tool does not rely on the operator's judgment, there is assurance that all bolts were run to specified tension.

Maintenance

The two Torque Control Impacttools get the usual rough handling that is inevitable on a construction project but also are the beneficiary of scheduled maintenance in the tool shack. The tools are lubricated every other day and are checked more thoroughly once a week. A third tool is kept in the shack as a standby but has not yet been used.

How to Prevent "Wicking" of Hose

WHEN the unprotected end of a rubber hose is placed in a liquid such as in a barrel of gasoline, "wicking" may occur that will shorten the effective life of the hose. The liquid will travel up the fibers of the reinforcement of the hose by capillary action similar to the action of kerosene traveling up the wick of the old-time kerosene lamp.

The liquid will attack and weaken the fibers for a considerable distance from the exposed end. "Wicking" may even cause the hose end to swell and eventually to fail. According to recommendations of field engineers of the Thermoid Company of Trenton, N. J., the simplest way to overcome "wicking" is to couple a length of **metal pipe on the hose end** long enough to prevent contact of the hose end with the liquid. The pipe should, of course, be inserted into the hose and not over the outside cover.

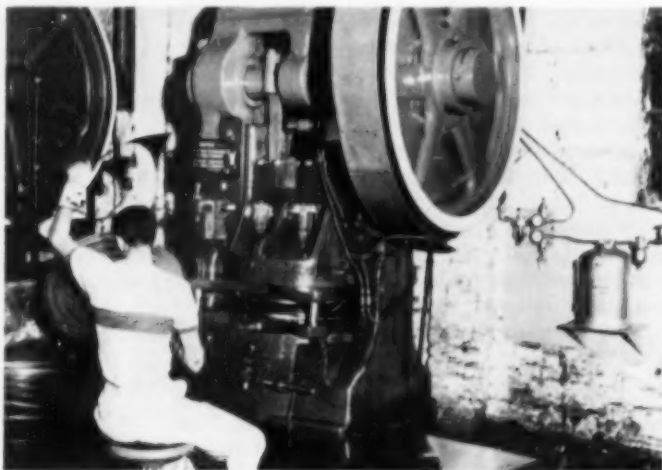
Another easy way to avoid "wicking" is to use a standard **metal end protector** which will seal the end against contact with the liquid.

A third possibility is the use of a **liquid neoprene rubber com-**

pound which dries in a durable film over the end of the hose and prevents the entry of liquids into the fibers of the carcass.

A fourth possibility is dipping

the end of the **hose in shellac** to form a film over the end of the hose. This is only good for water applications and should not be used with strong solvents.



Spray-Lubricant Ups Output

THIS BLISS 75-ton Punch Press at Fairfield Barrel Company,

Fairfield, Alabama, forms and cuts out of 28-gauge steel blanks the 24 $\frac{1}{2}$ "-diameter bottom plates for metal drums. Lubrication of the die and stock every 6th cycle was done by hand swabbing and was a messy and wasteful operation, performed about 400 times during an 8-hour day.

A Spray-Lube System manufactured by C. A. Norgren Co. was installed to lubricate automatically the die and metal blanks. Output of the machine increased from 2,350 to 2,700 pieces per 8-hour day, the life of the die was increased 100%, and lubricant costs were cut in half.

Keep Work Moving **FAST!**



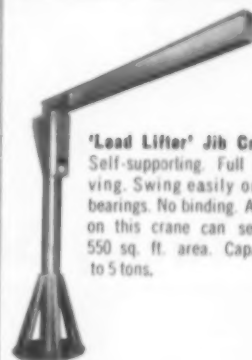
The Series "600" 'Load Lifter' Electric Hoist speeds production — lifts ½-ton loads at 30 FPM at the push of a button. Safe 24-volt push-button control starts this fast hoisting instantly. Two powerful, independently operating brakes are provided for extra safety. Each alone can hold the full load.

The "600" 'Load Lifter' is ruggedly built to meet industry's need for long-term hoisting economy and freedom from costly maintenance. Servicing is easy and safe in the air. No need to take the hoist down. Power and operating costs are low because the "600" mechanism is simple and frictional losses are minimized.

If you want lug or hook suspension, plain trolley or motor-driven trolley — you can have the "600" 'Load Lifter' to fit the need. Also available are current collectors, conductor cord trolleys and other devices to give you efficient, money-saving hoisting equipment from a single source. Capacities ½ and 1 ton. Ask your "Shaw-Box" Distributor for complete details or write us for Bulletin 408.



Series "600" 'Load Lifter' Electric Hoist with motor-driven trolley. Trolley available separately for hoists already in service. Installation takes only two hours with common tools.



'Load Lifter' Jib Cranes. Self-supporting. Full revolving. Swing easily on ball bearings. No binding. A hoist on this crane can serve a 550 sq. ft. area. Capacities to 5 tons.



Cord Reels to keep the hoist conductor cord taut and up out of the way of work and worker. Also useful for small cranes and other devices with motors up to 1 HP.



'Load Lifter'® **ELECTRIC HOISTS**

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION
390 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HAN-COCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.



The latest 26 Nordberg Radial engines are installed in this modern power house. Each engine has its own control panel and a central, automatic control board monitors the load on each engine.

Alcoa Increases Smelting Capacity of Texas Plant

Twenty-Six More Engines for Point Comfort

ALUMINUM production capacity of the United States is now about ten times as great as before World War II. It more than doubled during the years 1950-1955 and will probably increase another 40 per cent by 1958.

As part of its continuing expansion of aluminum production facilities, the Aluminum Company of America recently placed 26 additional Nordberg Radial engine-generator units in service at its massive smelting works at Point Comfort, Texas. Twenty-two more units have been ordered for delivery beginning in Spring, 1957 to provide electrical power for the seventh pot line. The new line, due for completion by January, 1958, will add 20,000 tons to the operation's installed capacity of 120,000 tons annually. This production requires the generation of 4,000,000 kwh per 24 hours.

A total of 220 Nordberg Radial engines with a maximum capacity of over 400,000 horsepower are now installed at the Point Comfort Works. It is by far the world's largest internal combustion engine power station. The newly ordered units will raise the capacity to over 470,000 hp. The original station, completed in 1950, had 120 Nordberg engines. Seventy-four generating units were added in 1952, an additional 26 in 1955, and 22 more are scheduled for 1957.

The recently installed Nordberg engines are identical to the 74 Radial engines installed in 1952. The engines are of the two-cycle spark ignition, gas burning type with 12 cylinders of 14" bore and 16" stroke. Rated 2125 hp at 400 rpm, they drive 1330 kw, d-c 667 volt Elliott generators. All 220 engines incorporate a dual spark

ignition system which permits them to efficiently burn the low cost natural gas readily available in the area.

There are now six separate power houses at Point Comfort. The first three house 40 engines each; the next two, 34 each and the latest, 32, including the 26 new Radial engines. The new power building is 440 ft long in contrast to the 500 ft length of the others. With this exception it is similar to the other power house structures.

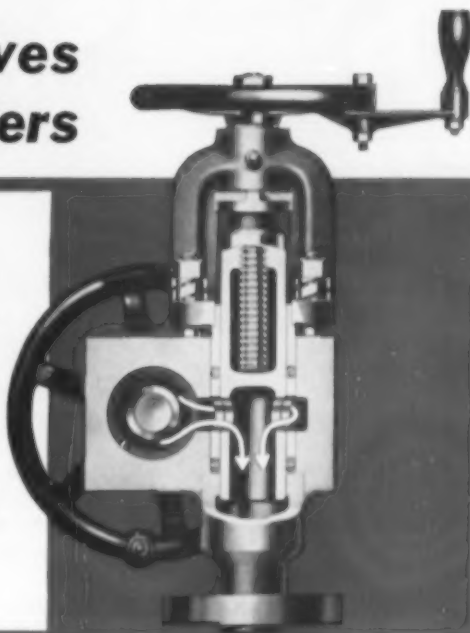
The Radial engines have made an enviable operating record. As of September 1, 1956, the 220 engines, including the 26 which were recently installed, have a combined operating time of 8,100,000 hours. During this time maintenance material and parts for major overhaul have been very low, and outages infrequent.

UNIT TANDEM

**rugged blow-off valves
for high pressure boilers**

HARD-SEAT—SEATLESS COMBINATION

■ For boilers up to 1500 psi, this Yarway Unit Tandem Blow-Off Valve offers the maximum in dependable service. A one-piece forged steel block serves as the common body for the Yarway Stellite Hard-seat blowing valve and the Yarway Seatless sealing valve. All interconnecting flanges, bolts and gaskets are eliminated. The Unit Tandem at right is sectioned through Seatless Valve to show balanced sliding plunger in open position and free flow.

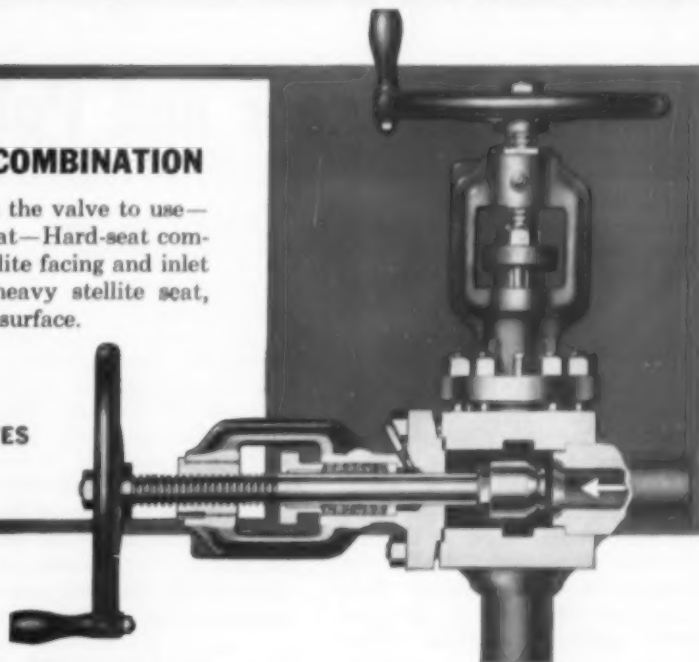


HARD-SEAT—HARD-SEAT COMBINATION

■ For boilers to 2500 psi, this is the valve to use—Yarway's Unit Tandem Hard-seat—Hard-seat combination. Disc has welded-in stellite facing and inlet nozzle has integral welded-in heavy stellite seat, providing smooth, hard-wearing surface.

**OVER 4 OUT OF 5
HIGH PRESSURE PLANTS
USE YARWAY BLOW-OFF VALVES**

Write for Yarway Catalog B-434



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BLOW-OFF VALVES



**Florida Public Relations Man
Tells Engineers How to Raise Standing of Profession**

The Engineer and Public Relations

Excerpts from an address by George Black, President, The George Black Company, Jacksonville, Florida, before a recent meeting of The American Society for Metals.

PERHAPS you never thought of it in these terms, but public relations is the key to your status, your professional standard, and your income.

Fortunately, or unfortunately in this world we are judged more by what people think of us than by what we really are, and public relations is really nothing more than the collection of thoughts which people have about a particular person, group, or company.

If we go on the assumption that professionalism must be earned and that it is earned through dedication to the welfare of society

through the use of one's creative self, then we must agree with Dr. Dinsmore of Goodyear Tire and Rubber. He says that the really professional engineer is one who is dedicated to the improvement and social acceptance of his profession, in the same manner that the professional minister is dedicated to the promotion and acceptance of his religious doctrines.

Life Complicated

Have you ever stopped to realize that not many years ago practically every item used in the home was thoroughly understood in all

its parts by the ordinary layman and that the artisan was universally judged by the excellence of his work?

Today there is scarcely a device we use in the home or in the office which the average layman can thoroughly understand or reproduce with his own hands. The complexity of our modern world, the increased use of gadgets, gimmicks and devices has placed the public at the mercy of the engineering profession, and with this dependence goes an obligation.

I am sure that most of you are familiar with the famous wartime story which tells of the plumber in the mid-west who noticed that whenever a piece of metal pipe was plugged up, all he had to do was pour hydrochloric acid into

it and the problem was solved. He also noticed, however, that the fittings never fit properly after pouring the hydrochloric acid, and as time went by the pipe walls became thinner and thinner and eventually sprung leaks.

Being a trusting man he wrote a letter describing his problem to a large chemical research laboratory in a nearby city. The following answer was received: "The efficiency of hydrochloric acid is indisputable, but the corrosive residue is incompatible with metallic permanence."

The plumber scratched his head and went on using the hydrochloric acid. The situation got a bit worse, and finally in desperation he directed another note to the same source.

The second letter had a bit of a pleading tone, and it just happened that a young, intelligent, down-to-earth technician around the laboratory caught the letter and replied in these simple terms: "Don't use hydrochloric acid for metal pipe. It eats the hell out of it."

I assure you the plumber stopped using hydrochloric acid, but more important, the engineering profession came close to losing another battle with the public.

There is no panacea for the difficulties faced by the engineering profession. I would, however, like to present a program which I honestly believe will raise the professional standing of the engineer and will help each and every one of you to get more out of your existing careers.

To help, let me introduce you to three friends that I believe can shed some light on the path to follow. Here is a young man named Johnny. He is a graduate of a large engineering school, and he has completely mastered the tools of his profession — not only that, but these tools — the slide rule, the drafting board — the instruments — these are his life and every day in every way he makes himself more and more proficient. He cares not what the end product may be. His life is wrapped up in manipulation of these tools.

Here is Jerry, Johnny's roommate, a good student too. He buries his head in the textbook and lives

in constant adoration of the great strides made by science. He worships DeVinci and Einstein and many names you and I have seldom ever heard. The world and its problems are not for him.

Here is Jimmy, a mutual friend. He too is a top student, but he doesn't seem too taken with the tools or the leaders of his profession. He has a "way" with people and is always pursuing some project or other which uses Johnny's technical skill or Jerry's tremendous background in theory. He will use his engineering only as a stepping stone to a sales or management position.

There they are . . . Johnny the technician, the slide rule sleuth; Jerry the longhair, the textbook talkie; and Jimmy the Manager, the people pusher. Each of them is an engineer in the eyes of the world, but not one of them is a true professional man dedicated to serving society through creative activity in his chosen profession. Measure them against the yardsticks for professional conduct and you will find them lacking.

Each of us has some of the Johnny, Jerry or Jimmy in us . . . and most of us, if we look real close, will find that we have let this influence drive the professional attitude and dreams out of everyday life.

We have become too busy doing or supervising the activity of others to remember that we are professionals. Our first task then is to show these traits of ours who is really boss. To do this . . . we must demonstrate a fundamental law of human behavior . . . *That nothing good happens without purpose and effort.* We must strive to knock the anti-professionalism out of our systems by a five part program:

Five Commandments

1. Communicate — We must get our story over to as many people as possible.

You don't have to be an orator or lecturer to communicate through the spoken voice. Try telling your wife and your friends about the work that you are doing, try getting across to them the meaning of it, the training required. Be proud of your work

and get that pride across to all who will listen. Don't keep it to yourself or express it in engineering terminology so that nobody understands it but you.

Stop talking to yourself, start talking to others. You'll be amazed at how many people are really interested in engineering jobs, in how products are made, in what materials are used for the variety of applications they see every day. Take your rightful place in your community by becoming a source of information about the things you do and the things you know.

If your talents permit communicate also through the written word. There are literally thousand of technical, semi-technical and non-technical journals for people just like you, and it may surprise you, but people just like you author the articles in them.

Let it be known by your presence, by your conversation, by your written word that you know what you are doing, that you are proud of what you are doing, and that you bring to your job an integrity and a feeling of obligation to do more than just that which is demanded of you.

Let it be known without any doubt that you are an individual with training, experience, intellectual capacity, and moral integrity — and that you are effectively devoting your skills and knowledge to the service of society.

Take your place in your company and in your community so that all who see may say without hesitation — "He is every inch a professional man."

2. Participate in society programs.

Take your part in making your society programs worth attending. See that their scope is broadened and that they include programs designed to build the prestige of your profession.

3. Attend meetings . . . not only of your own society but of those whose interests are related to yours . . . help these neighbors to further their professional development.

4. Cooperate with the schools . . .

There is tremendous room for improvement in the relationship between engineering societies



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tive in your area who has broad experience in every kind of industrial water problem. He will gladly analyze your water and prescribe the proper treatment to protect your equipment against costly corrosion and scale. What's more, he will continue to make periodic analyses to be sure you are being properly protected. The valuable service costs you nothing. It can save you much. Let us know when you would like to see him.

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and schools . . . particularly on the secondary level. Use your energies to help young people understand the high standards of the engineering profession.

5. Be a good citizen . . . not only in your community but on your job. Look at the work you do, not in the narrow 8 to 5 or so much per hour perspective . . . but from the viewpoint of its importance to the reliability of the finished product.

Think creatively about ways to do your job better, to improve quality, to cut costs, to speed production.

Put the trusteeship that your profession demands of you to work and be an individual professional man rather than an employee in your thinking and in your actions.

If you will follow the above five rules: If you will fight with all your energies for the creation and strengthening of a unified professional engineering body; If you will fight to stop this drive toward over-specialization and jealous independence; If you will fight the employee complex wherever it appears and strike out against the poor professional attitude by making service to society your number one dictum . . . *Good public relations will be yours* and with it professional, personal and financial recognition.

And what is more, from the day you start this program you will find that your life on the job and off it, will automatically become richer and more meaningful.

Good public relations will be yours if you never forget that you're an engineer and that an engineer is something to be proud of.

Editor's Note:

Mr. Black commented after checking this abridgement of his paper:

"The only portion of this speech I am sorry to see left out is some summation of the four major reasons for the gradually deteriorating public relations picture of the engineering profession.

"These include (1) the lack of unified professional body, (2) the tremendous drive towards specialization, (3) the attitude that engineers are merely employees, and (4) the poor professional attitude in general."

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Three Basic Lessons on Plant Application of Pumps Net Positive Suction Head

N P S H

By **WILLIS BABCOCK**

Chief Development Engineer
Aurora Pump Division
The New York Air Brake Company

PART 2*—Defines and explains cavitation, and shows how it is caused and controlled by variations in NPSH.

The phenomena of cavitation can occur only in liquids capable of vaporization. Most experts define cavitation as a localized vaporization of a liquid because of a reduction in pressure to the liquid's vapor pressure. Vapor bubbles are formed on the boundaries of a rapidly moving stream of the liquid as it passes over the impeller vane entrance tips. When these vapor bubbles reach a region of higher pressure, condensation within the vapor pockets occurs which induces a sudden high vacuum within the pocket. The high pressure outside the pocket then causes the bubble to collapse quite violently.

Because this entire action is instantaneous and violent, the liquid surrounding the bubbles hits against the impeller blades and shrouds and other parts of the liquid itself. Since liquids are not compressible, no cushioning of the forces involved is accomplished and a very sharp noise occurs. This noise varies in intensity with the rate that the bubbles are collapsed.

Impact pressures against the impeller vane surfaces have been calculated to reach several thousand pounds per square inch and are sufficient to eventually destroy any known pump materials. Repeated impact of the collapsing bubbles at the same locality causes mechanical fatigue and pitting much the same as an air hammer breaks up cement.

One theory also states that, in addition to the mechanical fatigue, particles are actually sheared from

the vane wall by the high impact pressures driving liquid into the metal pores, with successive impact blows driving liquid back out the pores, tearing out particles of metal as it leaves.

Frequencies of impacts have been measured up to 25,000 cycles per second with impact pressures of up to 300 atmospheres. Cavitation pitting and erosion may occur along any surface of the impeller passage and at the volute depending on the impeller and volute design and actual operating conditions. This pitting and erosion are often mistaken for chemical or electro-chemical corrosion.

Vibration

Cavitation also sets up vibration, which in turn can destroy pump shafts, bearings and seals. The magnitude of vibration is dependent upon the frequency of bubble collapse. Because of the larger flow capacities, higher velocities, and larger impeller surfaces, high frequency impacts are more likely to be found in larger pumps. Therefore, mechanical failures caused by this type of vibration are more prevalent in larger pumps.

Drop off Point

In addition to the sharp rattling noise and vibration prevalent when cavitation exists, a sharp drop off in head and capacity occurs. This

drop off point can be found on most centrifugal pump performance curves. Just before the drop off point, the liquid in the eye of the pump impeller has reached the vaporization point. The capacity of the pump at this point is all that may be passed through the impeller for the absolute suction head which exists.

Since it is not desirable to operate the pump in cavitation, more absolute suction head is required if more capacity from the pump is desired. For this reason, NPSH curves are usually published with the pump performance curve to show the absolute suction head required at any capacity to keep the pump from operating in cavitation. This is the primary reason for the concept of NPSH.

What absolute positive suction head is required by the pump to keep liquid from boiling or vaporizing—and thus prevent cavitation and its damaging effects to pump parts and performance? This is what you are actually asking when you inquire: "What is NPSH?"

Determining Factors

The factors which determine when and where cavitation will exist are:

- (1) The specific speed of the pump.
- (2) The design of the pump suction and impeller entrance.
- (3) The operating temperature of the fluid being pumped and its vapor pressure.
- (4) The capacity and head at which the pump will operate.

*Part 1 in the December issue discussed absolute pressure and vapor pressure and defined NPSH. Part 2 in the February issue will tell how to limit cavitation through control of NPSH.

(5) The actual dynamic absolute suction head or NPSH.

In most cases cavitation may either be avoided or corrected by any one or combination of the following practices:

(1) Keep available NPSH as high as possible by:

(a) Keeping the maximum available suction head on the impeller eye.

(b) Keeping the liquid temperature as low as is feasible.

(c) Keeping the suction pipe size as large as practical.

(d) Avoiding any unnecessary elbows or other fittings and valves on the suction line to keep suction line losses as low as possible.

(e) Selecting the pump which gives the most favorable NPSH requirements within the bounds of economy.

(f) Specifying the pump discharge head as near as possible to actual operating conditions. The most common cause of cavitation in pump installations is the specifying of pump discharge requirements far above the actual requirements of the installation. From the performance curve data, it is obvious that the tendency toward cavitation increases as the pump head drops or as the pump capacity increases.

(2) Keep the pump discharge head as near the specified head as possible and correct systems which are at fault in this respect by:

(a) Throttling discharge gate or other valve until cavitation noise disappears.

(b) Installing orifice or venturi in discharge line.

(c) Cutting pump impeller to a pre-determined smaller diameter.

(d) Reducing pump speed if possible and where practical.

(e) Decreasing discharge pipe size if practical.

(3) Where increasing the discharge head will not correct trouble:

(a) Lower pump nearer to water level where lifts occur if possible.

(b) Lower pump or raise water level if possible where suction head occurs.

(c) Increase suction pipe size and remove any unnecessary elbows, other fittings and valves, even if suction lines and pump have to be re-orientated.

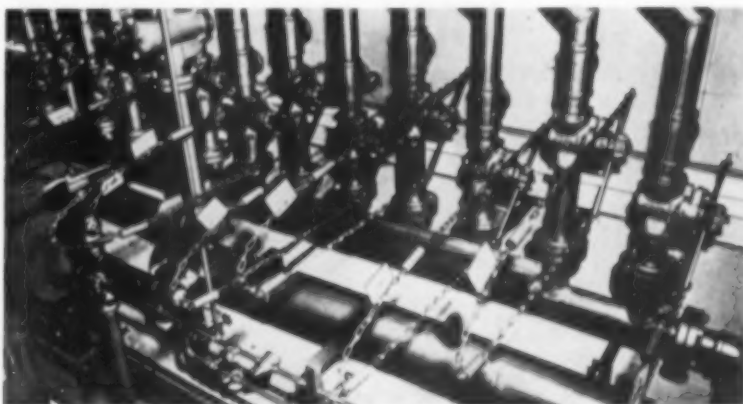
(4) As a last resort:

(a) Introduce air into the suction if corrosion damage will not occur. Air and water mixture is compressible and therefore the collapse of the vapor bubbles will be cushioned and the tendency of the cavitation to cause noise and mechanical damage will be lessened.

(b) Change to another type

pump. Regenerative turbine type pumps, Francis vane pumps, mixed and axial flow pumps have better low NPSH characteristics for instance, than radial vane pumps.

The final (Part 3) of this series will enumerate the factors that determine NPSH and show how to calculate its value. Problems and solutions will be presented.



Fast Acting Plug Valves

PARTICULAR attention was paid to valves when Esso Standard Oil Company built its new canning and distribution plant at Charleston, South Carolina, last year. Valves used on oil lines, in addition to satisfying normal requirements, had to be quick-opening, capable of rapid operation. Another requirement was compactness; because a number of valves would be mounted close together,

there was no room for bulky, projecting yokes and bonnets.

Esso solved the problem by specifying lubricated plug valves for a number of plant applications. This type of valve is designed to fully open or close with a quarter turn, which makes it readily adaptable to automation.

In its can-filling operation, Esso has equipped a series of Rockwell-Nordstrom lubricated plug valves with chains; a single pull on the chain opens the valve, another pull tightly closes it. In this manner all operations are speeded.

At the filling stations oil drums are filled at semi-automatically controlled machines, then sealed and conveyed to the warehouse for shipment.

High-speed automatic machines are used to fill smaller oil cans. About 300 one-quart or 60 five-quart cans may be filled each minute. After filling, cans are sealed and sent to carton-packing stations to be packed in boxes. From here the cartons go by pallet truck to the storage area.

SPI . . . 54th Year

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"Heating in our switch was causing 'lights-out' shutdowns until we changed to cooler operating Fusetron Fuses"

*Thomas Lavin, Building Engineer
Railway Exchange Building
Denver, Colorado*



Mr. Lavin Continues:

"We had considerable trouble with heat developing in a lighting switch and causing fuse blows. It was very annoying having the lights go out so often—and having regular maintenance work interrupted to replace fuses.

"Checking with an ammeter we found the continued load to be 28 ampere. This indicated that 30 ampere fuses in use were the right size for safe protection. Nevertheless, the renewable fuses we had installed kept blowing.

"Evidently, what we needed were the same size fuses that would operate cooler to eliminate heating in the switch.

"At the suggestion of a salesman we tried 30 ampere Fusetron dual-element fuses. Our heating problem immediately disappeared. This was 7 or 8 months ago and we have had no trouble with the switch overheating—and our—'lights-out' shutdowns are a thing of the past."

Here's why Fusetron Fuses protect against needless blows caused by excessive heating of panels and switches

Fuses, like other protective devices operate from heat created by the current flowing through them. Thus they produce some heat even in normal operation.

Sometimes the heat is not dissipated from switches and panels fast enough. This piled up heat over-heats fuses and reduces their carrying capacity. Then fuses often blow even though not loaded to their rated capacity.

A logical answer to this heating problem is the use of Fusetron fuses. Fusetron fuses produce less heat

because they have less electrical resistance than ordinary fuses. For example, ordinary fuses have 55 to 117% greater resistance than Fusetron fuses in 250 volt sizes and up to 140% greater resistance for 600 volt sizes.

Since the lower resistance of Fusetron dual-element fuses means less generation of heat, switches and panels operate much cooler. This materially reduces or wipes out entirely useless shutdowns caused by fuses blowing due to overheating of panels and switches.



Save time, trouble and money by using Fusetron dual-element Fuses.

THEY PROVIDE 10 POINT PROTECTION

- 1 High interrupting capacity—protect against heaviest short circuits. Have proven on tests to open safely on circuits set to deliver in excess of 100,000 amperes.
- 2 Protect against needless blows caused by excessive heating—less resistance results in cooler operation.
- 3 Protect against needless blows caused by harmless overloads.
- 4 Provide thermal protection—for panels and switches against damage from heating due to poor contact.
- 5 Protect against waste of space and money—permit use of proper size switches and panels.
- 6 Protect motors against burnout from overloads.
- 7 Give DOUBLE burnout protection to large motors—without extra cost.
- 8 Protect motors against burnout due to single phasing.
- 9 Make protection of small motors simple and inexpensive.
- 10 Protect coils, transformers and solenoids against burnout.

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FOR LOADS ABOVE 600 AND UP TO 5000 AMPS. — USE BUSS HI-CAP FUSES!

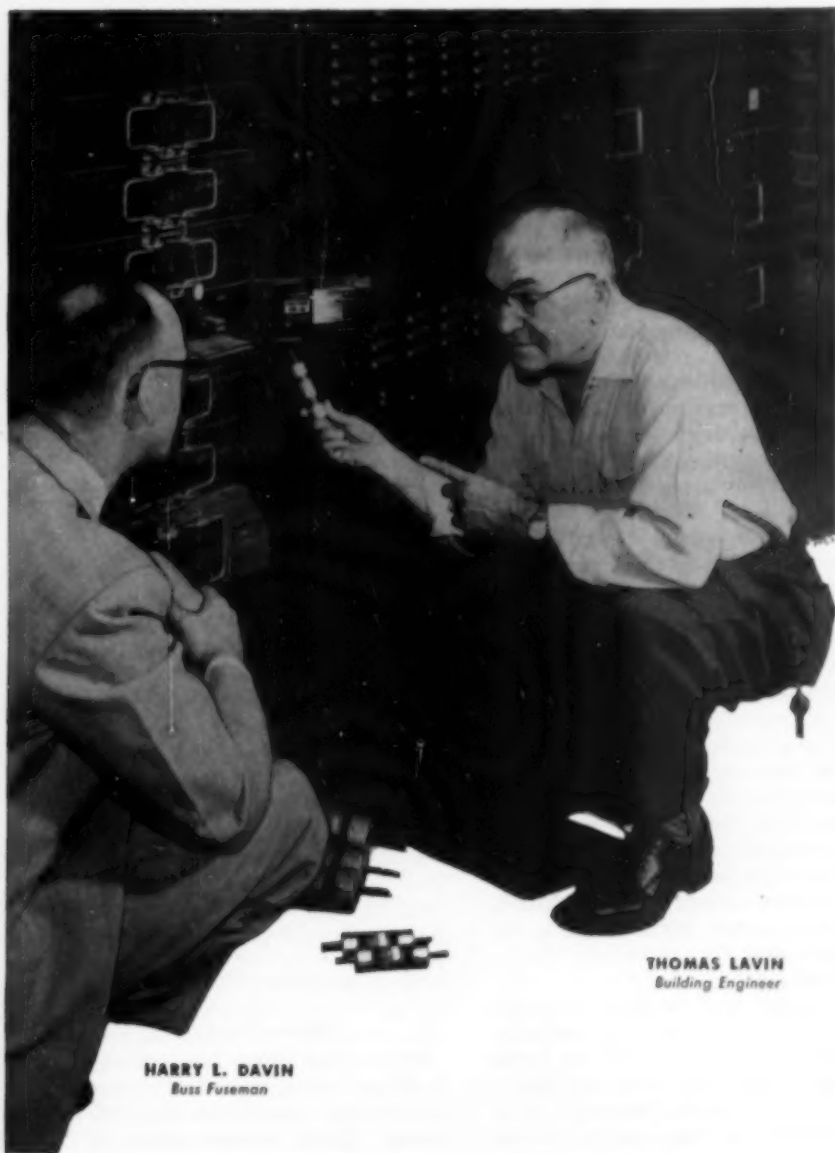
They have an interrupting capacity sufficient to handle any fault current regardless of system growth.

They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.

Write for bulletin HCS.

Play Safe! install FUSETRON dual-element Fuses and BUSS Hi-Cap Fuses throughout entire Electrical System!

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University at Jefferson,
St. Louis 7, Mo.



HARRY L. DAVIN
Buss Fuseman

THOMAS LAVIN
Building Engineer

PROPER SELECTION OF VALVES

Reduces Maintenance and Improves Operation

By A. T. LOHKAMP, Engineer

Pasco Packing Company
Dade City, Florida

VALVE SELECTION can mean the difference between an efficient and an indifferent operation. When valves are being considered for power or industrial service, the first consideration should be the kind of valve used.

Globe Valves

If the service requires a valve to throttle or regulate flow, a globe valve should be used. The amount and kind of throttling to be done will determine the kind of globe valve to be used. A needle valve in the small sizes will give accurate control and good service for relatively long periods. In larger sizes, the plug disc will give good service on the tougher applications. When a valve is desired for regular service where throttling is done at one-half to full open position of the valve, the regular type disc will give good service.

The globe valve with metal to metal contact between disc and seat will not close tightly if a small particle of metal or hard material becomes lodged on the seat. When slurries are being handled it is often advisable to use the diaphragm type valve or a valve with composition disc. By proper selection of the composition the valve may be made serviceable for almost any type product except that which is very hot. The replacement of discs and seats, diaphragms, or composition discs in these various types of valves is relatively simple and quickly done. Maintenance is therefore less costly than with gate valves.

Gate Valves

A gate valve should never be used for throttling service. When

used to throttle flow, the edges of the wedges or gates and seats quickly become damaged from wire drawing and the valve becomes useless as a cut-off valve.

Gate valves should be used where service requirements permit either fully open or fully closed operation. The greatest advantage of gate valves over globe valves in the full open position is their small resistance to flow. The average globe valve fully open offers from four to eight times the amount of flow resistance of the gate valve. This feature makes gate valves very desirable in steam lines, water lines or lines handling liquids where pressure drop is of great importance.

When using gate valves in steam lines of any appreciable size, it is advisable to install by-pass lines and valves around the gate valve so that pressures can be equalized on both sides of the wedge before attempting to open the valve.

The area of a wedge in a gate is the same as the cross-sectional area of the pipe line. Considering a pipe line of only 4 in. diameter having a gate valve for cut off, we find an area of 12.56 sq in. If we have steam pressure of only 50 psig, then there is a force of 628 lb pushing the wedge against the seat face. Opening this valve without first equalizing pressures (when-ever possible) will result in galled seats and disc and short life for those parts.

If the steam pressure were 200 psig the force would be over a ton and a quarter against the valve seat. When larger sizes are considered, the force becomes much greater and the valves become harder to open. Such valves have

very short service lives unless equipped with a by-pass and making provision to equalize pressures on both sides of the wedge before opening.

When using globe valves for throttling or controlling flow, it is often advisable to install a gate valve on the upstream side of the valve for shut-off purposes. When the globe valve becomes wire drawn, worn, or will not close because of obstructions, the gate valve can be used to stop flow while repairs are made to the globe valve.

Gate valves are best suited to applications where closing and opening are required at infrequent intervals. Frequent valve operation accelerates seat wear and gate valves are more difficult to repair than globe valves.

Materials

There is a choice of valve body materials such as brass, bronze, semi-steel, steel, cast iron, or alloys; and choice of materials in the seat, disc and valve stem which is common to both globe and gate valves. There is also a choice regarding the valve stem, whether it be a rising stem or non-rising stem, and whether the stem turns during valve operation or remains stationary. These choices are left to the discretion of the purchaser and depend upon the pressure, temperature and service for which the valve is intended.

Valve Discs

When globe valves are installed, they are usually installed so that line pressure is under the disc. This makes globe valves easier to operate than gate valves, with less

attendant scoring of seats and less wire drawing when partially open.

The story with a gate valve is far different as already discussed above. This makes the selection of the valve disc for various services an important function. There are four basic types of discs; the solid wedge, the split wedge, the flexible wedge, and the double disc type of wedge.

The solid wedge is by far the most common in use since it is one piece and will not get out of line, has no parts to jam because of misalignment. The solid wedge type is almost ideal for steam, water, air, oil and many other fluids. It is also best for turbulent flows because it will not vibrate or chatter.

The solid wedge has disadvantages when used on high-temperature service or service where it is subjected to frequent temperature changes. If closed while very hot, the valve body contracts more than the wedge and binds. The valve is then very hard to open and galling of the seating surfaces results.

With the flexible wedge, which is solid through the center but not at the edges, this jamming will not occur. The flexible wedge disc is used on certain high temperature steam applications.

In the split-wedge and double disc types of wedges, the wedges come in several parts. The double disc valve has the disks and valve seats perpendicular and parallel. As the valve is closed the halves of the disk drop into seating position and continued turning of the valve stem forces a spreader wedge down between the halves and forces them to make contact with the seats. As the valve is opened, the first movement of the stem releases the pressure against the discs and continued turning of the valve stem raises the disks from the seats. This is true of both double disk and split wedge valves.

Position in Line

While the solid wedge type of gate valve may be installed in any position in the pipe line, it is advisable to have the stem vertical wherever possible or at least not hanging down. To install a valve with the stem hanging vertically

downward is to invite trouble due to the lodging of loose scale particles or foreign matter beside the disk in open position and make closing almost an impossible job.

With the other types of valves, especially the split-wedge and double disk types, installation can not usually be made with the valve stem below horizontal. To do so is to invite trouble because of jamming, and frequently just the weight of the wedges or disks will cause the spreader wedge to jam the disks apart and will not allow closing.

Bonnets

The choice of bonnets for valves involves selection from three common types. The screw-in, the union-nut, and bolted bonnets.

The screw-in bonnet type is by far the most common and cheapest but its selection should be limited to those valves which will not require bonnet removal except at infrequent intervals. For valves where opening must be more frequent, the union bonnet is selected in the smaller sizes of valves, but for larger valves and valves used on high-pressure and high-temperature work the bolted bonnet is used. The fourth type or pressure seal is used for the very highest pressures and temperatures.

Stems

The choice of type of valve stem is often neglected when purchasing, but should be given close attention when there is a choice. The rising stem and inside screw is most common on smaller sizes of valves, both gate and globe valves. The non-rising stem and inside screw is available on gate valves and has particular advantage where head room is limited. These valves have the disadvantage of having the wearing parts of the stem and screw hidden and subjected to abrasion and clogging in the valve.

The outside screw and yoke type, while requiring more head room has several advantages in that the valve stem is not subjected to erosion, corrosion, or sediment inside the valve. The valve stem can be kept greased for easier operation and the position of the valve stem and amount of

valve opening are always subject to observation.

Check Valves

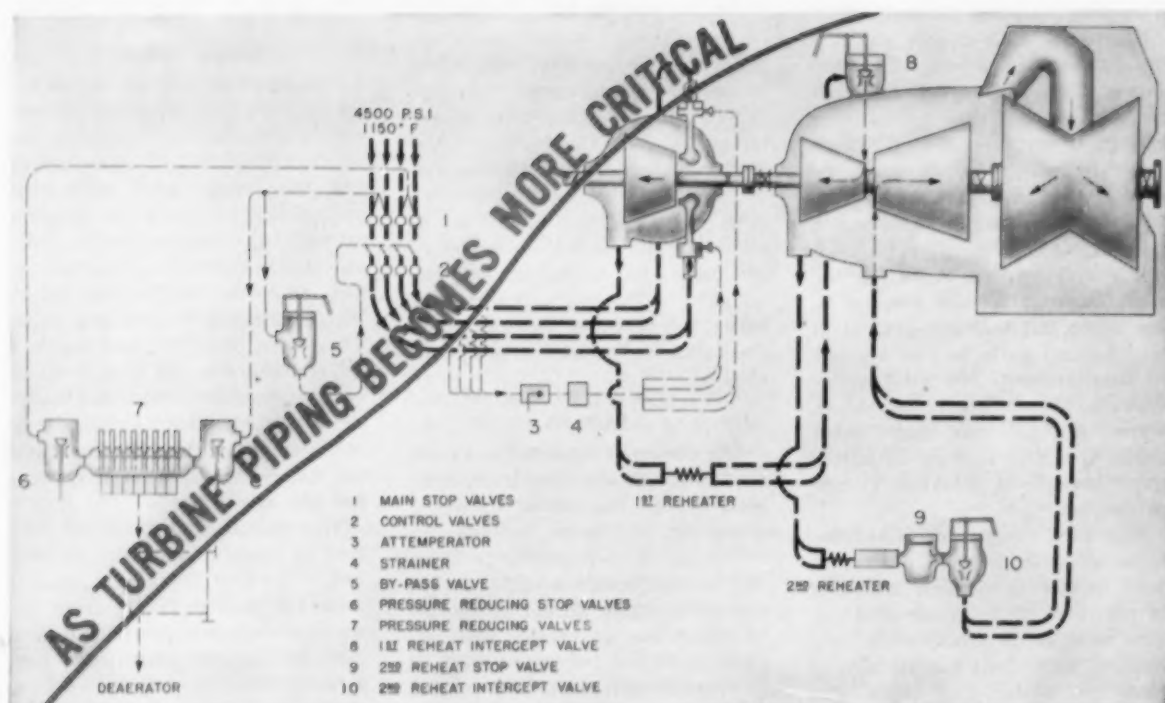
The selection of check valves for use in industrial and power plants depends on service. Generally the lift check is used with globe valves and the swing check with gate valves. The lift check has pressure drop corresponding to that of globe valves and opens in proportion to flow while the swing check offers little resistance to flow and is usually wide open in operation.

The lift check will usually be an unwise selection for services where it may be subjected to corrosion or sediment since the sliding parts are easily jammed so that they become inoperative.

The swing check because of its type of construction swings nearly free of the flow. Some swing checks have the disk swinging from the top of the valve so that it will have very little of the disk in the flow stream. Gravity and a scooping effect close the valve when flow is reversed. Sudden reversal of flow often results in severe slamming when swing checks of this type are used. This sets up severe casting and pipe strains. The lift-check is easier and more gradual in its action with less attendant shock when it closes.

Some swing checks are made which pivot on a stem placed above the center of the disk. These check valves have the heavier part of the disk at the bottom and are lighter at the top so that gravity also aids in closing. These disks ride the flow stream so that a loss of pressure or decrease in flow allows disk movement and these valves close with a minimum amount of shock and slam.

Another type of check valve manufactured has a disk type checking element which is spring loaded to offer slight resistance to flow. This also causes this type of check to be very sensitive to lessened flow. When flow is completely shut off, these valves close with practically no water hammer or shock to attendant equipment. These check valves are very successfully used in oil and water lines where the lift check would be subject to sticking and the swing check would cause severe hammer.



Schematic steam-flow diagram of the General Electric 125,000-kw turbine-generator unit at Ohio Power Company's Philo plant

Kellogg Engineering and Fabrication Keep Pace

The General Electric 4,500 psi, 1,150 F steam turbine at Ohio Power Company's Philo plant is a major advance in high pressure-high temperature design. Piping on the turbine typifies M. W. Kellogg's service to power generating equipment manufacturers and to the electric-utility industry.

All of the turbine high-temperature steam and control piping for this 125,000-kw General Electric unit was furnished by The M. W. Kellogg Company. Kellogg's responsibility included: the purchase of materials—largely Type 347 stainless; the development of individually tailored welding techniques; fabrication; and rigid

testing and inspection procedures.

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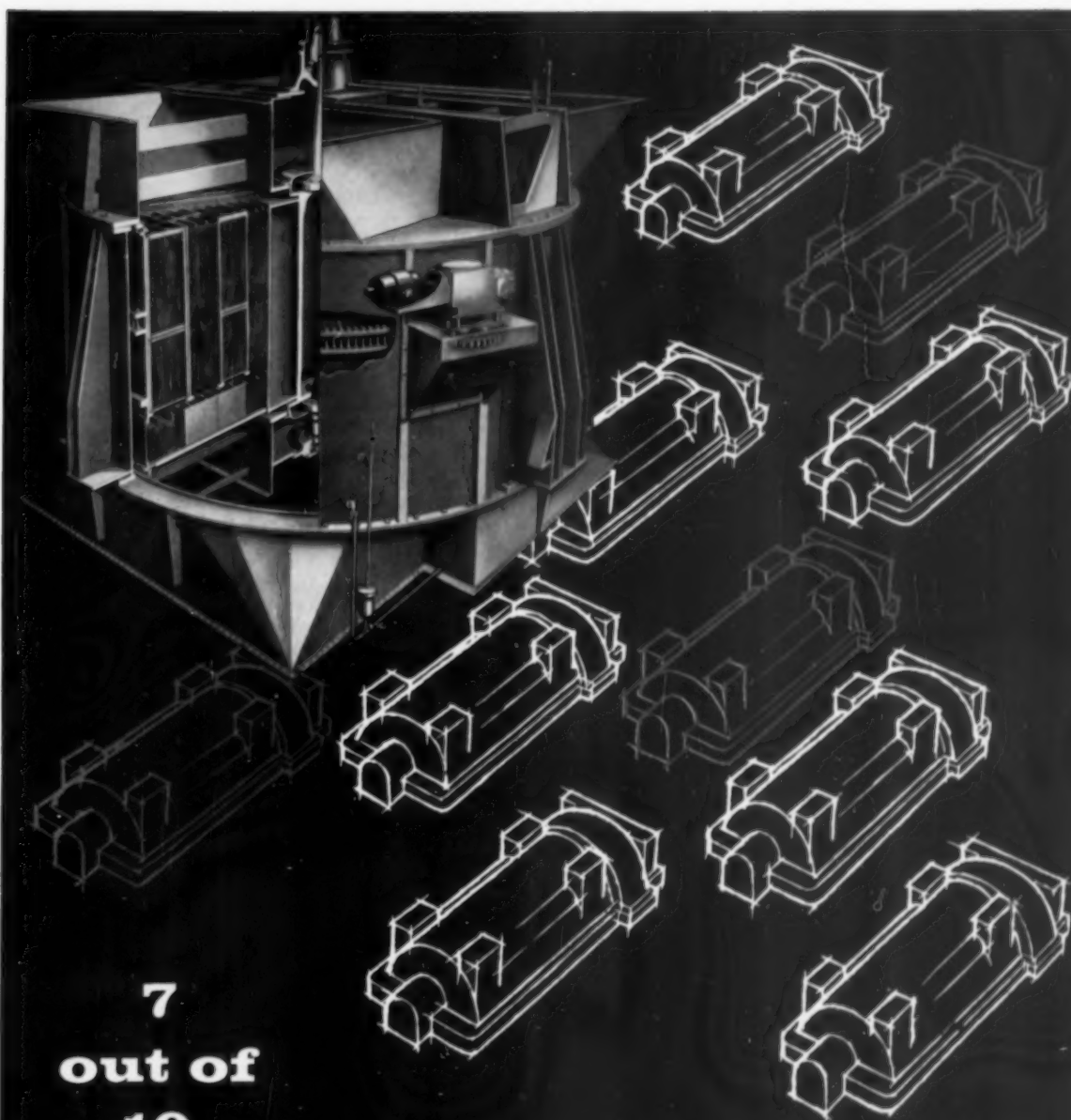
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The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

Atomics - - 1956 Advances

THE SOUTH is moving ahead with plans to integrate atomic energy into the industrial, educational and economic growth of the area. The first privately owned and operated research reactor was installed at North Carolina State College. Now throughout the nation industrial and educational organizations are banding together in the construction of industrial research and materials testing reactors.

Recent events demonstrate that the South intends to preserve its leadership through regional support of industrial and agricultural nuclear research including the construction of a research reactor to serve the entire region.

In other parts of the nation the specter of hazard in atomic power plants is causing quite a bit of concern where such plants are to be erected. Despite this concern, much of which is unfounded, plans are underway for the construction of atomic merchant ships and even the thermonuclear power plant is becoming a subject of lively speculation.

The world consciousness of the atom as an economic force is being brought into sharper focus with the United Nations pacts for international cooperation and such independent pacts as the European Atomic Pool and our own cooperative agreements with other nations.

South and The Atom

The Southern Regional Education Board held a conference at St. Petersburg, Florida, sometime ago to map an atomic program for the South. The conference lasted for three days and various committees advised by consultants sought to answer how atomic energy can be correlated with the economic and social growth of the South.

The following recommendations were advanced by the conference:

1. The establishment of citizens advisory committees on a state-wide and non-political basis.
2. Establishment of an information center with consultant services particularly in the area of nuclear medical training.
3. Installation of strategically located testing facilities to serve spawning nuclear industries.
4. A speed-up of agricultural atomic research efforts.
5. Promotion of scientific and mathematical education from high school through the professional schools.
6. More expanded and wider use of the regional radiation facilities jointly operated by the Oak Ridge National Laboratory and the University of Tennessee.

Governors Conference

The recommendations of the Regional Board were studied by governors from Southern states at the Southern Governors Conference in September. The Governors approved the recommendations in principle and took action to implement them. It was emphasized that the present status of the project is largely exploratory. It is expected that each state will appoint advisory committees covering such areas as industry, agriculture, medicine, power, education and labor.

Michigan Plant

Construction of a \$54,500,000 atomic power plant was begun on August 8 at Lagoona Beach, Michigan. The 150,000 kw plant is being built with private capital provided by Power Reactor Development Company, a combination of 26 industrial firms including Detroit

Edison and 17 other utility companies. The reactor will cost a total of \$40,500,000 and the remainder of the power plant will require an additional \$14,000,000. The plant is expected to be in operation in 1960.

Construction of the atomic power plant at Lagoona Beach has aroused vigorous protest in Washington. Senator Clinton P. Anderson of New Mexico and Representative Chet Holifield of California have protested the issuance of a construction permit by the Atomic Energy Commission. Holifield stated that the plant would menace the lives of thousands of people in the locality.

Admiral Strauss, Chairman of the Atomic Energy Commission, took issue with these complaints at the dedicatory exercises at the plant site. He said that the plant would be allowed to operate only after compliance with the Commission's rigid safety and health regulations. Walker L. Cisl, president of Detroit Edison and Power Reactor Development Company, asserted that all possible precautions were being taken and that it is unthinkable that those associated with the project would subject anyone to a dangerous environment. He pointed out that the design of the plant is such that any operating disturbance would be confined in the reactor with automatic shutdown of the plant.

The plant is unique among the projected nuclear power plants in that it incorporates a breeder reactor. A breeder reactor produces a saleable fissionable fuel as a by-product to producing power. The plant, to be known as the Enrico Fermi Atomic Power Plant, has

By **JOHN F. LEE**

Professor of Mechanical Engineering
North Carolina State College

been characterized by President Eisenhower as "another demonstration of America's determination to explore the beneficent uses of atomic energy for our people and people everywhere."

Thermonuclear Power

Research into the possibilities of the fusion process, or thermonuclear reactions, for the production power is very rigidly classified under Project Sherwood being conducted by the Atomic Energy Commission.

Although very little information of commercial value has been developed the secrecy has caused bitter criticism and wild speculations

concerning the practical use of thermonuclear power. Actually there is very little indication that the investors in conventional atomic power plants need worry about thermonuclear power for a long time. Nevertheless, as a long term proposition thermonuclear power offers considerable promise and there is always the chance of a sudden breakthrough since all the major countries are feverishly at work on its development.

In principle the thermonuclear reaction is a simple process. The process, known as a fusion process, transmutes hydrogen (deuterium and tritium) into helium. Far more energy is liberated in fusion

than in the fission process. The H-bomb is an uncontrolled fusion or thermonuclear fusion process.

The advantages of thermonuclear fusion over fission are: (1) Plentiful fuel supply since the ocean contains almost limitless supplies of deuterium, (2) Elimination of radioactive fission products and all the problems associated with shielding and waste disposal, and (3) The distinct possibility of direct conversion of the released energy into electricity.

The problems seem to be almost insurmountable. (1) Control of the energy produced in fusion is extremely difficult. (2) To carry out
(Continued on Page 70)

Safe Start-up and Firing Assured

LOSS of production time due to shut-downs of power-producing boilers is a situation facing many companies. This possibility was eliminated at the Green Stemmerly of Philip Morris Inc., in Richmond, Va., with the installation of two Fireye Safety Interlock Systems, assuring safe start-up and firing of the two boilers.

These systems, produced by Electronics Corporation of America, Combustion Control Division, have been in operation at the Green Stemmerly for almost a year.

With these advanced systems, production can be carried on smoothly without fear of work stoppage caused by boiler explosions. Most important, personal safety is now at a peak.

The two Fireye Safety Interlock Systems operating at P. M.'s modern Stemmerly are both designated

as MC3. This means that the burners are manually ignited, are fueled by either Bunker C oil or natural gas, and there are three burners per boiler. Such systems enforce the following procedures by boiler room personnel:

1. Pre-purge of at least four air transfers in the combustion chamber, boiler passes and stack before any pilot or main fuel can be introduced into the boiler.

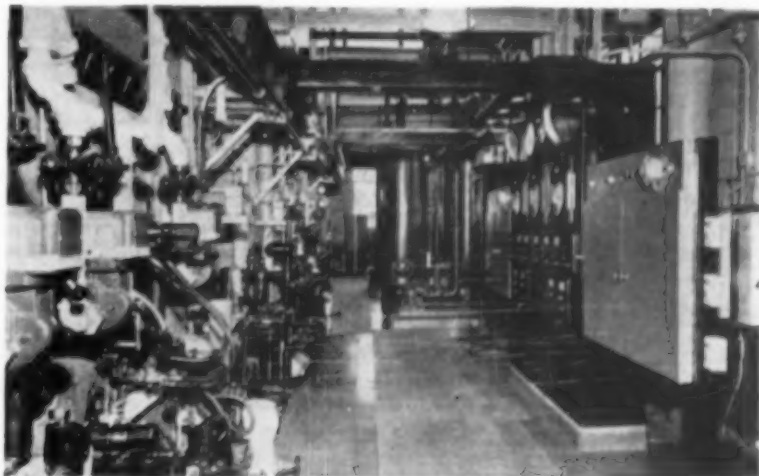
2. At the end of this purge, operator can insert a hand torch. If the torch is lit and established at a point for satisfactory light-off of main fuel, a light will indicate as such by going out.

3. After the ignition is proved, the main fuel valve is opened, and the main flame must be established and proved during a pre-determined 10-second priming period. If the flame is not established, the operator is required to proceed through steps 1 and 2 again.

4. If a flame failure occurs during normal operation of the burner, all fuel to that burner is shut off immediately and an alarm light goes on.

Because the Green Stemmerly prepares tobacco for world-famous Philip Morris Cigarettes, dependability of operation is imperative. The two Fireye Safety Interlock Systems, by protecting the plant's steam-producing boilers, have helped maintain production at an even keel during the past year.

The boiler room of Philip Morris' Green Stemmerly in Richmond, Va., now has two Fireye Panels to safeguard the light-off and operating procedure of the two boilers. One panel is seen at the far right with an alarm horn, while the other is on the opposite side of the control board.



Atoms—1956 Advances (Continued)

the process tremendous quantities of energy must be supplied in the form of heat resulting in temperatures in the order of 100,000,000 F.

Obviously no material can withstand such high temperatures. One possible solution to the containment problem is the use of an electromagnetic field to contain the reacting material. In effect the electromagnetic field serves as an insulator. One objection to this method is the large quantity of power required to maintain the magnetic field.

Other estimates indicate that a tank 330 ft in diameter, 3,300 ft long and capable of withstanding a pressure of 1500 psi would be required for a minimum thermonuclear reactor. This tank would have thirty times the volume of the Queen Mary. Yet this minimum thermonuclear reactor would produce heat capable of generating nearly five times the annual output of electricity in the United States. Hence the stakes are high enough to justify every effort to find practical solutions to the serious problems involved. When practical solutions will be forthcoming is anybody's guess.

The Maritime Administration and the Atomic Energy Commission have announced plans to proceed immediately with the construction of a combination cargo-passenger ship powered by atomic energy. It is hoped the ship will be in operation before the end of 1959. Congress appropriated \$40,000,000 for the ship of which \$18,000,000 will be spent to build the ship itself under Maritime Administration supervision. The sum of \$22,000,000 has been allocated for the nuclear power plant which will be constructed under the supervision of the Atomic Energy Commission.

The ship will have service speed of 21 knots. It will be capable of carrying 100 passengers and will have a cargo capacity of 12,000 tons. The ship will be powered by the most advanced type of pressurized-water atomic reactor. This will be an improved version of the type of reactor used in the Sub-

marine *Nautilus* and the Shippingport atomic power plant.

Research and Testing

Five miles of plastic tape with enriched uranium will be used in experiments to help determine the reactor design for one of the nation's first nuclear power plants. The Babcock & Wilcox Company has revealed.

Enriched uranium-235 will fuel an experimental reactor B&W is now assembling in its Lynchburg, Va., critical experiment laboratory, the first such facility in the country built by private industry. Fuel elements for the test reactor will contain the uranium-diffused plastic tape, sandwiched between thorium "converter" plates. This will be the first time that thorium has been utilized in a reactor.

In addition to providing a dispersal medium for uranium oxide, the tape will constitute an added safety device: in the event of an excessive power rise in the core, gas bubbles will form in the plastic, forcing an automatic shutdown of the nuclear reaction.

To produce the large amount of uranium tape the experiment requires, B&W scientists and technicians set up special extrusion production machinery. The equipment, located in the critical experiment building, disperses the powdered uranium in the polyethylene tape, clads it with pure plastic tape, cools it, and cuts it to the desired width.

Fuel Elements

The Babcock & Wilcox Company also revealed that it has "greatly reduced" production time on the manufacture of fuel elements it is making in its Nuclear Facilities Plant at Lynchburg, Va.

In its original contract with the Phillips Petroleum Company, which operates the Materials Test-

ing Reactor (MTR) for the Atomic Energy Commission, Babcock & Wilcox agreed to furnish a year's supply of 325 MTR fuel elements at the rate of 35 monthly.

While B&W spokesmen said that present capacity of the company's Lynchburg fuel element fabrication factory is "considerably in excess" of the production rate it is now maintaining, the building is undergoing a 150% expansion to accommodate other existing and future contracts.

Industrial Uses

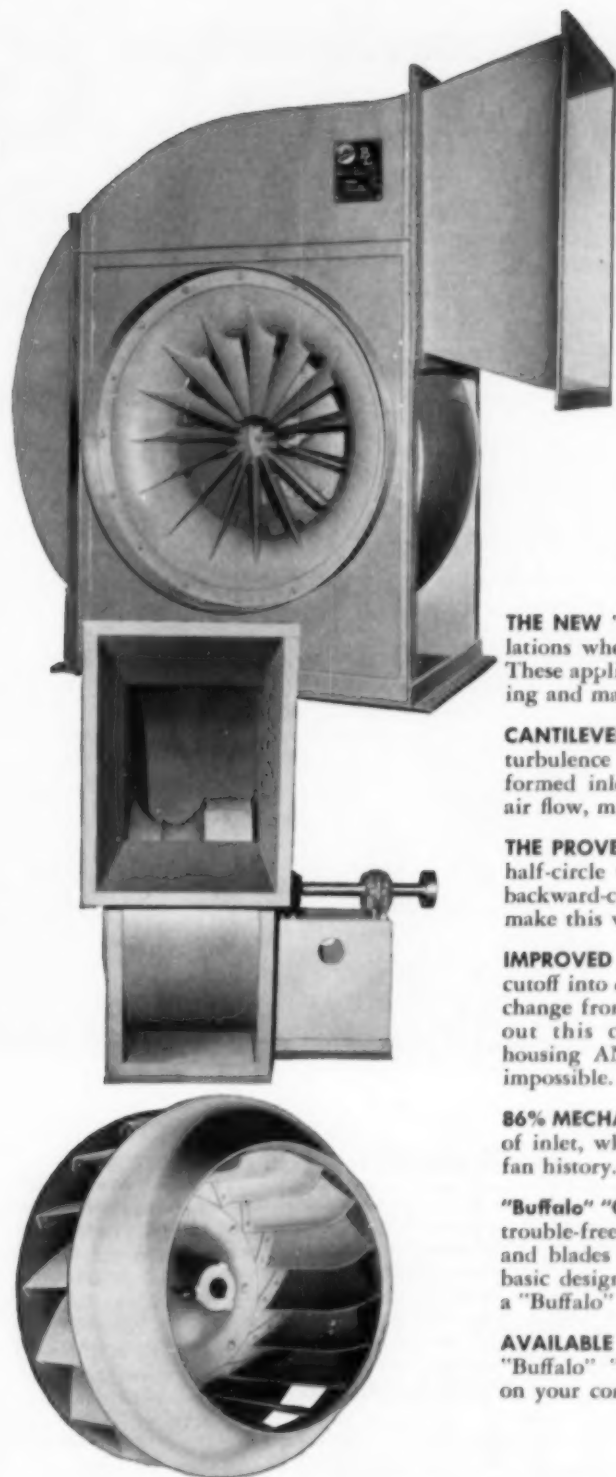
Ten companies representing such diverse interests as American Machine and Foundry Company and American Tobacco Company have joined in the formation of a new company to build, administer and operate a research reactor near Princeton, New Jersey. General Walter Bedell Smith of AMF was named president of the new company which is known as Industrial Reactor Laboratories, Inc.

The reactor will be of the swimming-pool type with an energy level of 5000 kw of heat. The reactor alone will cost in excess of \$1,500,000. Each member company will have private space available at the reactor facility, to conduct its investigation. One member company, Corning Glass Works, will use the facility to accelerate the development of stronger, more durable glass and to investigate new uses for glass.

The Atomic Energy Commission has received bids from eleven companies for the construction of a food irradiation reactor for the Quartermaster Corps, U. S. Army. The project, called the U. S. Army Ionizing Radiation Center, will provide an intense source of gamma radiation and facilities for the Army's food irradiation and preservation program and materials experimental program.

Alco Products, Inc., has opened a nuclear laboratory on the banks of the Mohawk River in Schenectady, New York. The laboratory is similar in principle to the "critical" facility at Lynchburg, Virginia, and will be used initially for studies in connection with the Army Package Power Reactor Program.

USE READER SERVICE
Service Cards — Page 17



NEW!

BUFFALO "BLH" **FOR CLASS II THRU IV** **VENTILATING-INDUSTRIAL &** **MECHANICAL DRAFT SERVICE**

THE NEW "Buffalo" Type "BLH" FAN is engineered for installations where total pressure requirements of $3\frac{3}{4}$ " and up exist. These applications include mechanical draft, conduit air conditioning and many industrial applications.

CANTILEVERED INLET VANES eliminate center ring, reducing turbulence and improving air flow through the inlet. The die-formed inlet vanes and inlet bell further contribute to smooth air flow, minimizing effects of unfavorable inlet conditions.

THE PROVEN BL WHEEL has a deep drawn flange to form a true half-circle with the inlet cone. Highly efficient non-overloading backward-curved blades, solid back plate and extra heavy hub make this wheel ideally suited to this service.

IMPROVED FAN OUTLET — reduces outlet air turbulence from fan cutoff into duct by making more even, gradual change from velocity to static pressure. Without this complete streamlining of inlet, housing AND outlet, such high efficiency is impossible.



86% MECHANICAL EFFICIENCY — made possible by a combination of inlet, wheel and housing design. The smoothest "air-ride" in fan history.

"Buffalo" "Q" FACTOR* CONSTRUCTION gives you many years of trouble-free service. Housing is all-welded construction. Wheel and blades are riveted and welded for maximum strength, the basic design having been thoroughly tested in the Vacuum Pit, a "Buffalo" exclusive.

AVAILABLE in wheel diameters from $18\frac{1}{4}$ " to $80\frac{3}{4}$ ", the new "Buffalo" "BLH" merits your consideration. Write for details on your company letterhead — today.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

SOUTHERN POWER & INDUSTRY for JANUARY, 1957

For more information, use Reply Card—Page 17

71

Work Schedules for Continuous Operations

WORK SCHEDULES for continuous operations in process industries, steam plants and other utilities involve three main factors that should be given careful analysis and consideration: convenience to workers or operators, convenience to management, and consideration of cost in form of "bonus" or overtime payments.

The workers usually prefer to group their off days together, rather than work a few days then off one day only. Working six days with two days off is preferable to working three days with only one day off.

Management wants schedules that will give the best worker-performance. In some instances non-rotating work schedules are better than rotating because of specific job assignments that are to be performed regularly, and maximum efficiency is obtained by not changing workers.

Wage policies vary so much in different communities that no definite formula can be applied in all cases. But as increased hourly payments normally start after 40 hours, or on the sixth or seventh consecutive day worked, it is usually an advantage to set up a schedule of five or six work days, allowing two days rest. This is beneficial from the cost standpoint, and also provides the worker better rest and recreation.

We will first consider a type of work schedule (1) that requires four men for operating three shifts. The schedule will average out to 42 hours for each man over a period of eight weeks. As in all continuous operations, no time is computed for lunch periods.

The upper schedule (1), while shown for four men, can be used for any number of employees. It requires three regular shifts, plus a rotating relief shift, which is

designated by the number "4" shown in the various columns.

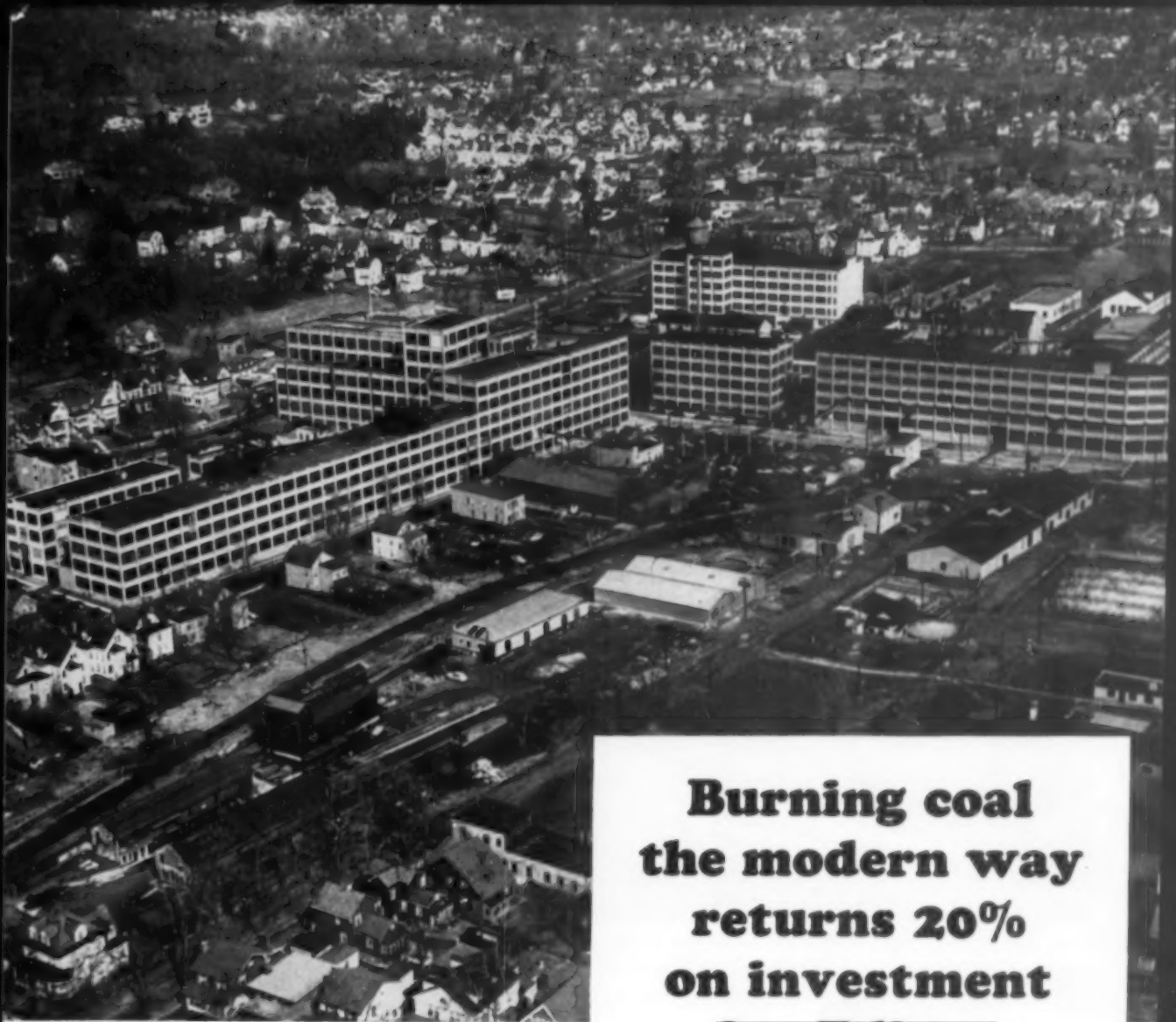
The advantage of the above schedule is that it allows each man two Saturdays and Sundays off in eight weeks operation. A repetitive point is reached at the end of the eighth week. The number of credit hours will also equalize itself in the same period of time. Each man works six days with two off. The key point in preparing the schedule is proper starting, as shown for the first week. Third to seventh weeks inclusive have been omitted from the diagram for convenience in printing.

The lower schedule (2) gives the operator only one day off at a time (every fourth day). In some plants this is preferred to any other type schedule. Note that it gives each employee every fourth Sunday off. The repetitive point is at the end of fourth week.

1 — FOUR-MAN NON-ROTATING SHIFTS, 8 HOURS EACH DAY, 6 DAYS ON AND 2 DAYS OFF												
SHIFT	1st WEEK						2nd WEEK					
	M	T	W	T	F	S	M	T	W	T	F	S
1st	1	1	1	1	1	4	4	1	1	1	1	1
2nd	4	4	2	2	2	2	2	4	4	2	2	2
3rd	3	3	4	4	3	3	3	3	4	4	3	3
1st shift 8:00-4:00 2nd shift 4:00-12:00 3rd shift 12:00-8:00												
NAME	HOURS											
1 - John Doe	48						48					
2 - Jim Brown	40						40					
3 - Joe White	40						40					
4 - Jack Gray	40						40					

2 — FOUR-MAN NON-ROTATING SHIFTS, 8 HOURS EACH DAY, 3 DAYS ON AND 1 DAY OFF												
	1st WEEK						2nd WEEK					
	M	T	W	T	F	S	M	T	W	T	F	S
#1	IN	OUT	IN	IN	IN	OUT	IN	IN	OUT	IN	IN	OUT
#2	IN	IN	OUT	IN	IN	IN	OUT	IN	IN	IN	OUT	IN
#3	IN	IN	IN	OUT	IN	IN	IN	OUT	IN	IN	IN	IN
#4	OUT	IN	IN	IN	OUT	IN	IN	IN	OUT	IN	IN	OUT
	3rd WEEK						4th WEEK					
	M	T	W	T	F	S	M	T	W	T	F	S
#1	IN	IN	IN	OUT	IN	IN	OUT	IN	IN	IN	OUT	IN
#2	OUT	IN	IN	IN	OUT	IN	IN	OUT	IN	IN	IN	OUT
#3	IN	OUT	IN	IN	IN	OUT	IN	IN	OUT	IN	IN	OUT
#4	IN	IN	OUT	IN	IN	IN	OUT	IN	IN	OUT	IN	IN

These two schedules are basically very similar. Both will give an average of 42 hours per week for each worker. The big difference is the manner in which off days are arranged.



Burning coal the modern way returns 20% on investment for Edison

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

The firm of Thomas A. Edison, Inc., West Orange, N. J., was faced with a common problem—rising steam plant costs. A thorough survey indicated the need for modernization of the power system. As a result, six 30-year old boilers were replaced with two 60,000 lb./hr. units. FD and ID fans, pneumatic ash systems, coal pulverizers and related equipment were installed.

Modernization has paid off at Edison! Steam-generating capacity per sq. ft. of boiler room space has been doubled, labor costs have been cut, fuel costs are down, boiler efficiency is up 16% and modernization gives a 20% annual return on a net investment of 2.7 mils per BTU!

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

BITUMINOUS COAL INSTITUTE
Southern Building • Washington 5, D. C.

GREENLEE BROS. & CO.

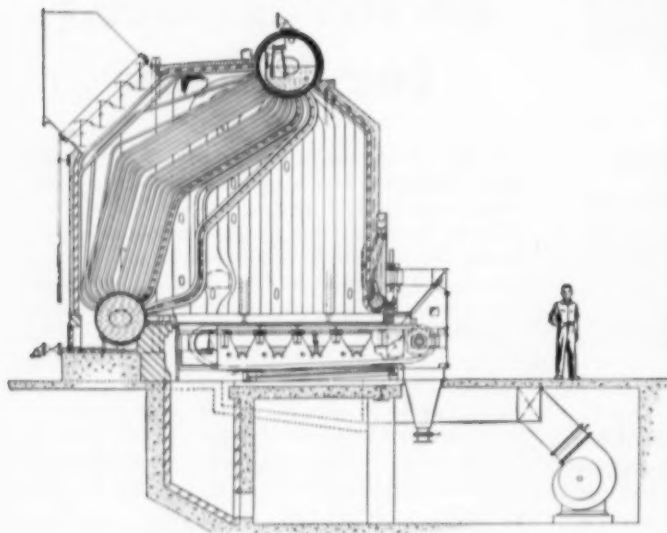


Diagram of B&W Integral-Furnace Boiler with Jet Ignition Stoker. Each unit generates 30,000 lbs of saturated steam per hour at 125 psig.



Two B&W Integral-Furnace Boilers at Greenlee, equipped with B&W Jet Ignition Stokers, burn a wide variety of Illinois bituminous coal.

CUT FUEL COSTS 14%



HERE'S WHY YOUR STEAM COSTS LESS

With B&W Integral-Furnace Units

- Minimum floor space and headroom requirements
- High fuel economy
- Smokeless combustion
- Adaptable to all fuels and firing methods
- Economical fast steaming
- Water-cooled furnace
- Clean, dry steam at all ratings, even with high boiler water concentration
- Quick response to wide and heavy load swing demands
- Easy to inspect and clean
- High availability with least attention

B&W Boilers with Jet Ignition Stokers assure savings despite increased fuel prices

As one of the country's leading manufacturers of machine tools, Greenlee Bros. & Co., Rockford, Illinois uses large amounts of steam for all year operation of air compressors and for plant heating. And to maintain profitable overall operation it is important that the steam supply be dependable—and steam generating costs kept to the minimum.

Since the installation of two B&W Integral-Furnace Boilers, Greenlee has enjoyed uninterrupted steam service from a dependable, efficient source. Equipped with modern B&W Jet Ignition Stokers, the B&W units have established an outstanding record of operating efficiency while burning a wide variety of Illinois bituminous coal.

At Greenlee, as at other industrial plants using steam, careful consideration of long term costs and proven reliability were important factors in the choice of B&W Integral-Furnace Boiler units.

If your steam production cost is important . . . if you are considering steam plant modernization or expansion for increased dependability and efficiency . . . it will pay you to investigate B&W's more than 90 years of boiler experience. Let us show you what it can do for you. For further information or assistance write to The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-773-B





Electrical Conduit for Louisiana Hospital

THE BENDABILITY of Spang HD Galvanized Conduit (Spang-Chalfant Div. of The National Supply Company), is illustrated as an electrician employs a "hickey" during an electrical conduit installation at the \$10 million T. E. Schumpert Memorial Hospital, Shreveport, La. Spang Conduit, ranging in sizes from $\frac{1}{2}$ to 4-in., was approved for the structure by Neild & Somdal & Associates, Shreveport consulting engineering and architectural firm.

To service electrical needs, more than 70,000 ft of galvanized conduit and 120,000 ft of Spangleam (a thin-walled conduit) were used. The Cahn Electric Company, Inc., of Shreveport, handled the electrical contracting.

Elevator Hoistway Doesn't Go Anywhere

CONSTRUCTING the elevator hoistway before erecting the building itself is the solution evolved by R. Harrison, Sr., of the M. R. Harrison Construction Co., Miami, working with Otis Elevator Company engineers, to a knotty construction problem in putting up a new parking garage.

Plans for the garage, which is to be self-service, require installation of two duplex collective control elevators of 2,000 lb capacity each. When Otis Elevator Company, to whom the contract was awarded, surveyed the job, engineers estimated that it would take about 12 weeks to have the elevators in running condition—after completion of the machine room. But since the building is to be constructed with unfinished walls, the operators, under normal conditions would want to begin using it before the machine

room could be completed. This then would entail another three months' delay while the elevators were being readied.

To overcome this difficulty, it was decided to erect the hoist-



ways as soon as the building foundations were in. The contractors devised the system of forming the hoistway walls on the ground level. These forms included inserts for elevator guide rails and a steel ladder in the rear shaft wall. Using slab construction, a front wall, two side walls and a rear wall were formed and erected. These walls are 8" reinforced concrete with angles fastened in and projecting around the perimeter. This was done in a way that once the wall slabs were in and plumbed level the fastenings could be welded together. The six-story elevator hoistway was thus erected on job site in the record time of four days.

Once this phase was completed, the pre-formed machine room slab was hoisted into place and concrete block walls erected around the machine room area. The roof slab, also precast, was then set in.

Installation of the elevator equipment is being completed, and it is expected that the elevators will be in full operation before the building is fully erected.

Baffle Improves Pipe Cutting Job

WHEN converting the bottom section of a well pipe to a water screen, it is necessary to make many perforations in the pipe with an oxy-acetylene torch. These slits must be large enough to let the water in, but small enough to deter entrance of rock and sand. And the cuts must be lengthwise along the pipe to assure maximum strength as it is forced into the ground.

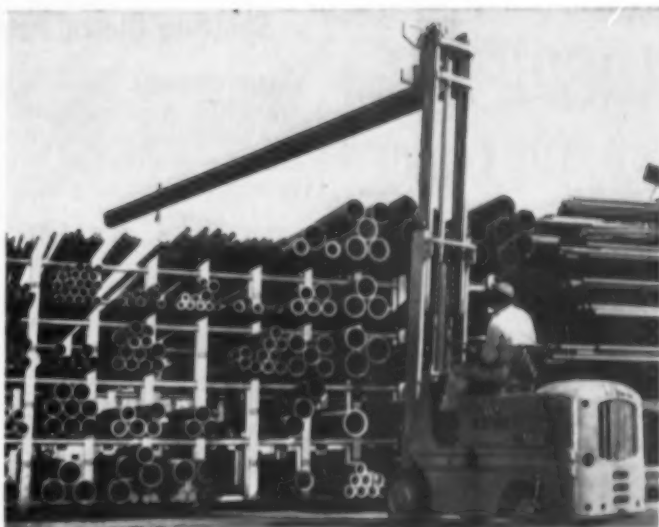
An irksome annoyance attends such a job, since in making the cuts with the torch, the slag melted by the cutting torch sprays into the pipe, there to stick to the sides and often plugging up the other fresh-cut slits.

We minimize the effect of this spray by using a "slag catcher" which is a piece of steel $\frac{3}{4}$ -in. thick and 3-in. wide, poked inside

the screen. It blocks the flying bits of molten slag and most of the slag will adhere to this steel plate and not to the walls of the well pipe.

When the cutting of one set of slits is completed, we scrape the plate around the walls of the screen to smooth them. A heavy chain serves to keep the pipe in place on the bench and this can be readily adjusted or moved during the process which involves cutting over 90 ten-inch slits to make the well screen. Using an angle iron as a straight edge to guide the cutting torch, each cut is clean and even, minus slag that tends to slow up or stop the flow of water.

By STANLEY CLARK, East Bradenton, Fla.



At Tube Turns, Louisville, Kentucky . . .

Guard Saves Skull

ALTHOUGH struck on the head by a 10 lb metal plate driven by tremendous pressure, Lemuel W. Medley, an employee of the Fischbach and Moore Company at Tullahoma, Tennessee, escaped fatal injury and received only a slight laceration of the forehead as his safety hat absorbed the brunt of the blow.

Handling the electrical work on construction of a wind tunnel and other testing facilities for the U. S. Air Force, Fischbach and Moore Company was under contract jurisdiction of the Corps of Engineers, U. S. Army.



The 26 screws in the bushing shipping cover plate of a transformer had been removed to allow workmen to take off the cover, a $\frac{3}{4}$ -in. thick plate, 18-in. in diameter. The plate was stuck and Medley had begun prying it loose when nitrogen gas pressure inside the transformer blew the plate upward.

Mr. Medley was working while in a kneeling position, and with his head downward over the cover

Ram Type Lift Truck Stores Tubing

VIRTUALLY all standard forms of inplant lifting and moving equipment are used by Tube Turns, Louisville, Ky., to transport materials quickly, safely and economically.

One of the plant's special materials handling devices is a ram type lift truck, used to store certain classes of tubing in racks that reach to a considerable height and effectively utilize air space. When a piece of tubing is to be stored, the ram is inserted, raised, then tilted to hold its load firmly. The tubing is carried to the rack area, elevated and deposited on top of the proper stack in a matter of minutes. It is withdrawn for production purposes by reversing this procedure. Before the introduction of the ram type lift truck, the tubing was stored manually, or with the assistance of small portable cranes, which often proved time consuming.

The ram type truck is powered by a 65 hp gasoline engine and has a capacity of 6,000 lb. It can travel 8.5 mph, forward or backward. The hydraulic lift and tilt levers are conveniently located near the steering wheel, and the truck has other features that contribute to its efficiency.

plate. The cover plate struck the front of Medley's Skullgard and then spun 50 to 60 ft into the air.

Mr. Medley was knocked semi-conscious and another workman prevented him from falling approximately 25 ft. Upon removal to the dispensary, it was found he had received only a small forehead laceration and he returned to work after treatment. The Skullgard is a product of Mine Safety Appliances Company.

**"LUBRIPLATE,
THE OUNCE
OF
PREVENTION"**

says
VULCAN IRON WORKS, INC.
of Chicago, Ill.



—a leading manufacturer
of pile driving and
extracting equipment

"For many years we have used LUBRIPLATE Lubricants for shop assembly, and have recommended them to our customers through your LUBRIPLATE Tag Plan. Our experience shows that if the proper lubricants are used from the beginning, there are fewer problems and parts replacements later. We consider LUBRIPLATE to be the best possible ounce of prevention."

H. G. Warrington, Vice-Pres.

**REGARDLESS OF THE SIZE AND
TYPE OF YOUR MACHINERY,
LUBRIPLATE LUBRICANTS
WILL IMPROVE ITS OPERATION
AND REDUCE MAINTENANCE**

LUBRIPLATE LUBRICATION

**MAKES CARS
AND TRUCKS
RUN BETTER
AND LAST
LONGER**



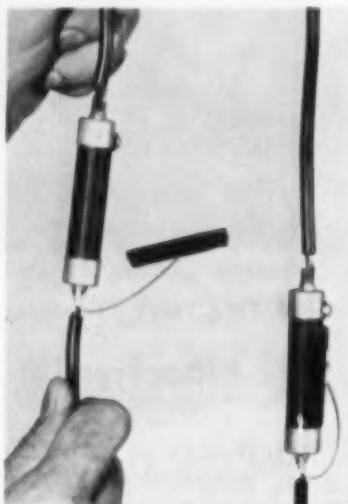
LUBRIPLATE H. O. S.
MOTOR OIL . . . THE OIL
THAT NEEDS NO
ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



Spotting Blown Fuses

MAINTENANCE men will no longer have difficulty spotting blown fuses on pole-type secondary capacitors with this new "red flag" indicating fuse, now standard equipment with General Electric secondary capacitors.



When the fuse blows, the red plastic flag pops up and can be spotted readily from the ground. The fuse itself remains intact, an important safety feature because it eliminates the possibility of a free-swinging hot lead causing secondary faults. A four feet long insulated lead is supplied with the fuse.

Welded Tube Condenser

RESULTS of development work on the welding of condenser tubes to tube sheet to meet today's trend toward higher pressures, once-through boilers, and nuclear plants requiring positively pure water have been revealed by Allis-Chalmers Manufacturing Company.

Allis-Chalmers has made hundreds of welding tests with some 100 different combinations of tubes and tube sheet alloys over a period of several years. In connection with this work, the company has developed an automatic welding

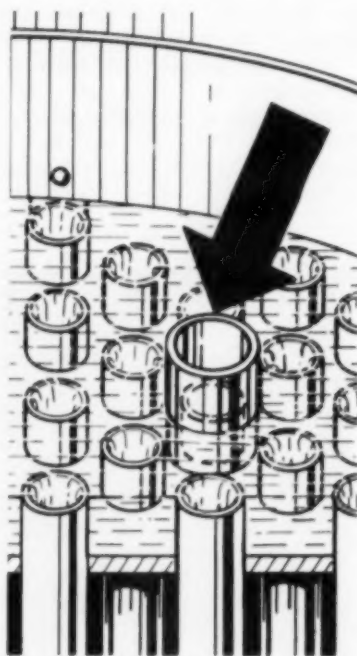
device with all welding being done with the heli-arc process.

To prevent tube sheet distortion, circular pits or grooves are cut in the tube sheet around each tube hole leaving a collar around the hole which is about as thick as the tube itself. This technique reduces the current required for welding and the corresponding amount of heat generated. The result is a neat doughnut of metal fused from the tube and the collar.

Tube Cleaning Hint

THE OLD-TIME open-shell-type water-cooled heat exchanger still being used in many plants can be kept effective through periodic cleaning. The lower head pressure obtained by cleaning the tubes also lowers overhead costs. The relative age of this equipment should not lead to its neglect. The following tip on cleaning the tubes of such units allows maximum tube-cleaning speed and efficiency without taking the heat exchanger off the line.

First, cut a piece of pipe so it is several inches longer than



A short piece of pipe placed over the tube end facilitates tube cleaning while this type of heat exchanger is kept on the line.

the tube projecting above the tube sheet. The pipe should be large enough to let a hand enter. Then place the pipe over the tube to be cleaned, as shown in the sketch. The tube forms a cofferdam that keeps most of the water from flowing down the tube.

The absence of water in the tube reduces the back pressure on the tube-cleaner motor and permits greater power to be delivered to the cutter head, brush, or other accessory. The result will be higher operating speeds. In addition, the absence of a large volume of water will eliminate the cushioning effect on cutters and the large frictional drag encountered in underwater tube-cleaning operations. The operator will also be happier, because water will no longer be splashed in his face as he cleans the tubes.

Data courtesy **THOMAS C. WILSON, INC.**

More Motor Power

SEVERAL years ago, pumping capacity in a large Gulf Coast chemical plant was increased from 71,000 to 90,000 gpm per motor by using silicone insulation, including an outer layer of Silastic tape, to uprate four sea water pump motors from 300 hp at 277 rpm to 450 hp at 327 rpm.

One of these motors was removed after a few months to realign the shaft seal. A small leak in the upper housing was also discovered when 25 gallons of rain water poured out of the housing. The silicone insulated coils were still in excellent condition, even though they had been operating half submerged in water for some time.

Based on that and similar experiences, the Electric Machinery Company of Minneapolis started to produce a line of large "Sil-Clad" motors. Built in open frames and protected inside and out with silicone paints and silicone insulating materials, these motors are claimed to be less expensive to buy and more serviceable than TEFC type motors built with Class A or Class B insulation.

another

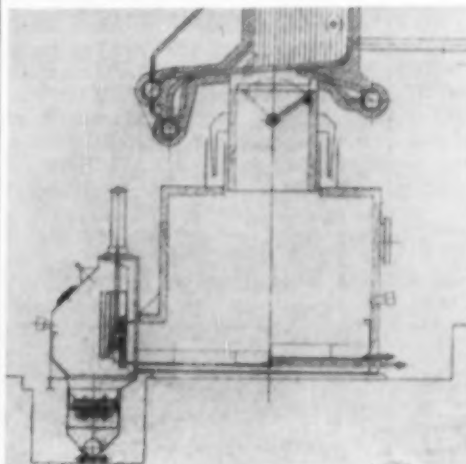
Beaumont

installation

**FLOODED SLAG HOPPER
SHOWING HOUSING
AROUND PISTON
OPERATED DISCHARGE
GATE.**



BEAUMONT BIRCH SLAG HANDLING SYSTEM SERVES NEW PRESSURIZED FURNACE, CYCLONE BOILER AT GREENWOOD MILLS MATHEWS NO. 2 POWER PLANT, GREENWOOD, S. C.



Beaumont Birch Equipment in this installation includes flooded slag hopper with seal trough and overflow seal chamber, power operated slag breaker, discharge gate, slag crusher with fluid drive, jet type ash pump, slag discharge pipe.

Beaumont designs, manufactures and installs hydraulic, pneumatic and mechanical ash handling systems, skip hoists, bucket elevators and conveyors for coal, coke, ash and chemicals.



Beaumont

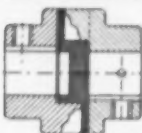
BIRCH COMPANY

1505 RACE STREET, PHILADELPHIA 2, PA.

DESIGNERS — MANUFACTURERS — ERECTORS BULK MATERIAL HANDLING SYSTEMS



Maintenance-Free FLEXIBLE COUPLINGS



Standard Duty Types
0.5 to 40 hp. at 1750 rpm.



Medium and Heavy Duty Types
2.6 to 810 hp. at 100 rpm.



**Radially
Removable
Types**
1.9 to 30 hp. at
100 rpm.—2 to
40 hp. at 1800 rpm.



**Flange-Mounted
Types**
11 to 740 hp. at
900 rpm.

Put Trouble-Free Performance Into Your Equipment

COMPARE THESE FEATURES:

- A type and size perfectly suited to your application.
- Year-after-year dependability, regardless of load or operating conditions.
- Completely machined for ease and speed of alignment.
- No lubrication required.
- Simple, rugged construction—few parts and no intricate mechanisms.
- Cushioned power transmission—load is transmitted through cushioning materials—no wear on the metal jaws.
- Double-life cushions—one half the cushions act as idlers, except on reversing loads—quick interchange provides a new set of cushions.

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VIRGINIA: Richmond—304 E. Main Street
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LOVEJOY FLEXIBLE COUPLING CO.

4811 WEST LAKE STREET • CHICAGO 44, ILLINOIS

Equipment . . . Supplies



Heat Transfer Medium

A-1 Thermon, a non-metallic plastic compound with highly efficient heat transfer properties, is available from **Thermon Manufacturing Co.**, 1017 Rosine St., Houston, Tex.

It is applied in a viscous paste form over either conventional steam traced or thermal electric systems, working equally well for heating or cooling systems. When cured to cement-like hardness, it bonds itself to the coils and equipment to form an unbroken thermal connection. It utilizes the entire surface of the tracer tubing and conducts this heat to the surface to be heated, or away

from the surface to be cooled.

Thermon has been tested in laboratory kilns in temperatures up to 1700 F and is currently being used in systems up to 750 F in alternate hot and cold service without any signs of cracking, spalling, degradation, or other ill effects. In addition to its heat transfer properties, it has excellent mechanical and thermal shock resistance with linear shrinkage of less than one percent.

Thermon may be used wherever expensive steam jacketing systems are ordinarily employed and in numerous cases where steam jacketing is impossible, with a savings of up to 75%. It may be applied to new or existing equipment.

Flexible Connecting Hose for Fluid Transfer Systems

A-2 A new quick-connect hose coupling manufactured by **Titeflex, Inc.**, Springfield, Mass., is claimed to improve operation, increase safety and reduce piping installation cost.

New coupling technique can replace the conventional fixed piping lines (with built-in valve manifolds) where the opening or closing of

appropriate valves sets up the desired fluid transfer lines.

Processing plants have the basic problem of materials handling. Raw materials (liquids) stored in tanks have to be moved to processing units (filtering, blending), or to finished material storage tanks and then to packaging units, or directly from treating or processing unit to the packaging equipment.

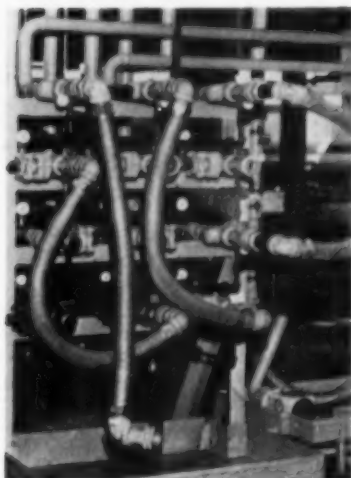
The new Titeflex connecting hose joins fixed piping lines, the flexible

FOR FREE INFORMATION —

Circle Code Number on Page 17 Return Card

hose or "connecting link" being rapidly connected and disconnected from the fixed lines by quick-connect, "snap-on" type of hose couplings.

Where these snap-on flexible hose links are used in place of multiple-valve installations, it is most convenient to run the fixed pipe lines to a central point so that a snap-on flexible hose link can be rapidly shifted from one line to another, resulting in a switchboard-like arrangement of the fixed piping. The couplings can be dependably used for high pressure, high-capacity liquid lines.

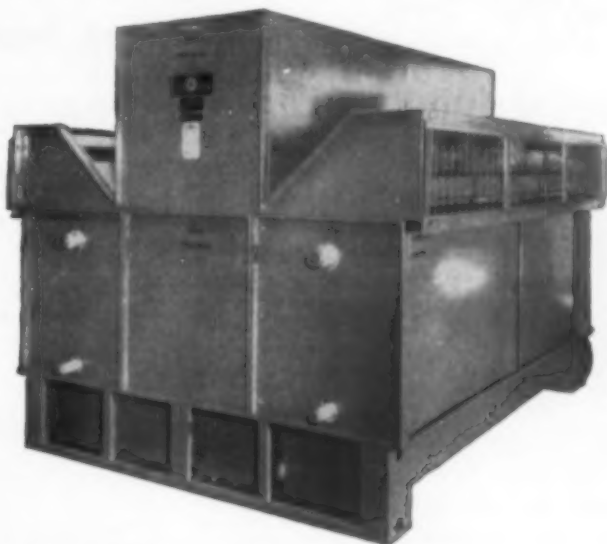


Close-up of piping switchboard for processing battery. Note accessibility of pipe lines for easy connection by flexible connecting hose.



Snap-on operation: Collar on coupling body (C) is pulled back slightly from forward spring-loaded position. This releases retaining balls in coupling body, which can be slipped over coupling nipple (N) on end of desired line. When collar on coupling body is released, spring snaps it forward and locks retaining balls in groove (G) of nipple, securing coupling and flexible hose to fixed line.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17



NIAGARA SECTIONAL Aero HEAT EXCHANGER

*gives close temperature control,
saves you **LABOR**, Power, Water*

- Because the new design improves the heat transfer to the out-door air by evaporation.
- Because new features keep your equipment working for long life with "new plant" efficiency...always full capacity.
- Because you save 95% of cooling water cost.

You get faster, more accurate cooling of industrial fluids to specified temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

Write for Niagara Bulletin 132. Ask for the full story of how you can save expense in your plant and improve your product's quality.

NIAGARA BLOWER COMPANY

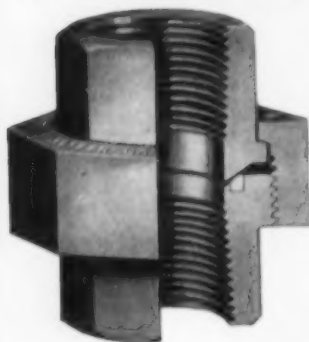
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jefferson A-4 PIPE UNIONS



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Why not find out for yourself, in your own plant and under your own specific conditions, just exactly what JEFFERSON UNIONS can do for you in reducing installation and maintenance costs of piping systems and in assuring tight joints and complete satisfaction.

In spite of the fact that we make doubly sure Jefferson Unions are 100% right for the services for which they are designed by careful testing and inspection before shipment, you are invited to see for yourself just what all this means in protection for you . . . in terms of dollars and cents, and in all-time freedom from trouble. Remember, Jefferson Unions are approved by Underwriters' Laboratories when installed in the services for which they are designed.

For example: Jefferson A-4 Pipe Unions are recommended and approved for 500 psi steam and oil at 500° F., or 2000 psi non-shock cold W.O.G. in sizes 1/8" to 2". This means that in many cases, Jeffersons can replace higher cost steel unions with a resulting saving in first cost.

Why not, therefore, let us furnish samples, WITHOUT CHARGE, for your own trial and test. Contact us direct or through your nearest distributor for your trial needs. This offer incurs no obligation except for you to give Jeffersons a fair trial.

The complete Jefferson line includes 150#, 250# and 300# unions, union elbows, union tees and flange unions. Brass-to-iron seats as well as iron-to-iron are available.

Tell us what sizes of A-4 unions you would like to test and we will send them along without charge.

**JEFFERSON
UNION CO.**

**45 Fletcher Ave.,
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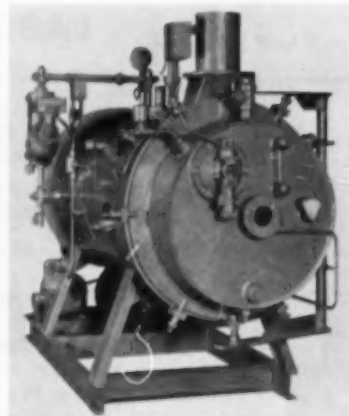
REMEMBER: TRY THEM

Equipment, Supplies & Methods (Continued)

"Wet-Back" Packaged Steam Generator

A-3 A new 50-hp "Steam-Pakette" (York-Shipley SPH-50) for oil or gas firing has been designed by York-Shipley, Inc., York, Pa., with a circular water chamber at the rear head. The "wet back" does three things: (1) it carries off excess heat, permitting operation at a higher boiler rating; (2) it provides a condensate receiver, and (3) it preheats the water that goes to the boiler tubes.

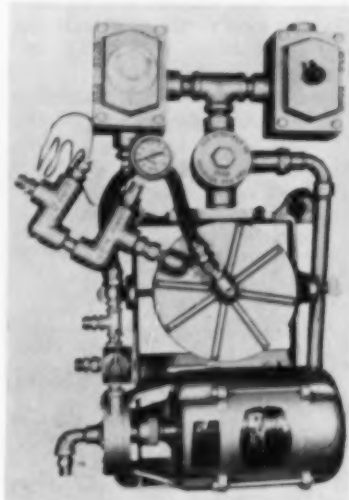
The water-cooled rear head makes it possible to fire a boiler size formerly rated at 30 hp at up to 50 hp. The firing head on the new 50-hp wet-back boiler is fundamentally the same as on the 30-hp dry-back boiler, but a larger forced draft blower and a 3-hp burner motor are employed.



The new 50-hp boiler contains under 100 sq ft of heating surface and slightly less than 3 sq ft of equivalent grate area.

Boiler may be fired with either No. 3, 5 or 6 fuel oil and/or by manufactured or natural gas. Steam can be supplied at an operating pressure up to 125 psi.

As a condensate tank, the cylindrical chamber added onto the rear head functions in the ordinary manner; that is, it collects the condensate return and provides a reservoir for the make-up water. The condensate and the cold make-up water are fed into the rear head in the same manner as they are fed into the conventional condensate tank. However, no extra floor space is required for the condensate system.



Hot Spray Heaters With Dial Temperature Controller

A-4 The Spee-Flo Co., 720 Polk Avenue, Houston 2, Texas, manufacturers of hot spray equipment for industry, have introduced the Viscomatic—an external dial temperature controller for their hot spray heaters.

Any desired temperature in a 90 to 170 F range can be dialed externally and controlled within a plus or minus two degrees. The Viscomatic is explosion proof and is factory installed with the required heater.

The introduction of many new finishing materials with varying temperature level requirements has increased the demand for easy temperature adjustment on hot spray equipment. Temperature variation from 150 F to 170 F produces little or no viscosity change. At levels below 150 F, however, temperature changes cause marked differences in viscosity. With the Viscomatic, correct operating temperature for the material in use can be dialed.

Spee-Flo Circaflo models (illustrated) maintain a constant hot spray material temperature at the gun. Efficient centrifugal pump recirculates material from heater to gun and return. Units are available in single or dual models, capacities of 7.5 to 15 gallons per hour.

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PVC Pipe

A-5 Easton rigid (unplasticized) PVC pipe is now available in all standard pipe sizes from 1/4" to 6", according to **Easton Plastic Products Company, Inc.**, Easton, Pennsylvania.

PVC pipe is solving difficult piping problems in a steadily increasing number of applications in all industries. It resists corrosion and most chemicals, and meets many requirements of the chemical, pharmaceutical, food, and process industries, where inertness and purity are paramount.

These chemical properties, combined with desirable mechanical and dielectric properties, have also brought Easton PVC Electrical-Plastic Tubing (EPT) into demand for protection of electrical wiring from attack by corrosive liquids, fumes, moisture, or atmospheric conditions.

Easton PVC pipe and tubing is precision-sized to close tolerances, and is dimensionally stable. Easily worked and assembled, it can be sawed, threaded, welded, cemented, machined, and formed with conventional equipment. Its weight is only half that of aluminum, one-sixth that of steel; yet it has high structural strength and a tensile strength of 5500 to 7000 psi.

V-Belt Holder

A-6 A new versatile tool for applying Alligator V-Belt Fasteners to open end V-belt has been announced by **Flexible Steel Lacing Company**, 4607 Lexington Street, Chicago 44, Illinois for B and C Section V-Belts.



This handy pocket size V Fastener Tool enables the user to make up V-Belts of any length much quicker than heretofore was possible. The low cost of this tool will now enable the many small users of V-Belts to keep a few feet of open-end V-belt plus the tool on hand to make fast emergency replacements thus avoiding costly machine down time. Bulletin V-219 gives details.

Greenwood Mill's New Mathews Power Plant No. 2 uses *Continental* Coal Handling Equipment Throughout



It was our privilege to work with Greenwood Mills and Mr. W. L. Bross, Chief Engineer, in designing, detailing and furnishing this complete and efficient coal handling system from track hopper to bunkers.

CG-5714

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Equipment, Supplies & Methods (Continued)



Tube Expanding

A-7 Air Magnetic Control of Elliott Co., Springfield, Ohio, brings a new concept of torque control into tube expanding. Its operation is based on a powerful permanent magnet that gives positive and instantaneous engagement and disengagement between driving mechanism and the driven expander. The control is air-driven and therefore ideal for rolling tubes in hazardous locations. It is

a single compact unit (weight 10 lb, length 10 1/2 in.) and is well balanced for ease in handling.

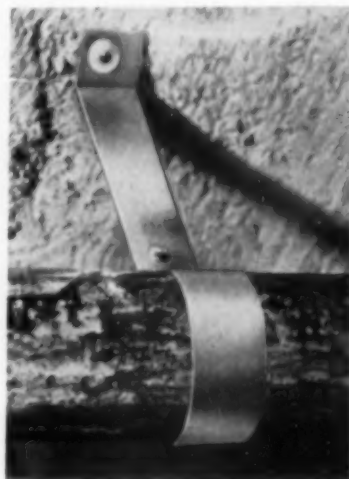
The control features a sensitive, easily adjusted calibrating dial that permits exact settings for torque control. There are no springs; therefore results are absolutely consistent. It has a positive drive action that stops instantaneously when pre-set torque is reached. Then, after disengagement of expander, the motor runs free, cutting the number of required stops and starts in half

and also the control has an on-off locking switch and separate reversing trigger permitting uninterrupted sequence of operation. It has a quick-release chuck that locks expander securely, yet allows snap motion insertion or removal.

The control comes in a fitted metal case that holds both the control unit and expanders. It operates on 28 to 30 cfm of air at 90 psig. A single 3/4 in. air hose is the only connection required.

Pin-Grip Masonry Anchor

A-8 Pin - Grip Masonry Anchors, manufactured by Star Expansion Central, Inc., 142 Liberty St., New York 6, N. Y., assure faster, more convenient fastening. By merely driving the pin protruding from the head flush with the head, a permanent, tight fastening job will result.



A hole is drilled in masonry (concrete, brick, cement or cinder block, etc.) with a Star Rotrtwist masonry bit or a Star drill and hammer the diameter of the Pin-Grip. Insert the Pin-Grip through the fixture into the masonry hole. Drive the pin flush with the anchor head using an ordinary hammer. The stainless steel pin, nested in the bored aluminum body of the Pin-Grip, forces out four expanding prongs which grip the wall within the masonry hole. Star's Pin-Grip Masonry Anchor is recommended for securing clamps, electric cable straps, utility and junction boxes, fuse boxes, etc., to any kind of masonry. A wide range of sizes are available to meet every requirement.

DURA PLASTIC *Teflon* packing for chemicals

DURA PLASTIC
STYLE 666 F
Die-Molded Rings

DURA PLASTIC
STYLE 66 F
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A Completely Lubricated **TEFLON PACKING**

Durametallic's answer to sealing corrosive fluids—DURA PLASTIC TEFLON PACKING. It provides long uninterrupted sealing on all liquids except molten alkali metals and some fluorine compounds in the higher tem-

peratures. Particularly suitable for packing rods, shafts and stems on processing equipment handling hot caustics, acids, alkalis or organic solvents from -90°F. to 450°F. Supplied in die-molded ring or spiral form.

WRITE FOR DURA PLASTIC TEFLON PACKING BULLETIN 4615P

DURAMETALLIC
KALAMAZOO



CORPORATION
MICHIGAN

Screw-On Cleat for Conveyor Belts

A-9 "Tatch-A-Cleat" available from **T. H. Hinchcliffe**, 1450 La Loma Rd., Pasadena 2, Calif., is a molded neoprene screw-on cleat that will convert any conveyor or elevator belt into a cleated-belt. It's such a simple operation that a "do-it-yourself mechanic" can make the conversion with nothing more than a punch and a screwdriver.



The neoprene cleats are attached to the belt by flat head machine screws and special countersunk washers secured to threaded metal inserts vulcanized in the base of the cleat. Inserts are imbedded in concave cups. When screw is tightened against washer, it pulls belt into cup, and both screw-head and washer sink below surface of belt, where they cannot contact pulley.

Originally designed for the food industry the new neoprene cleats are also being used successfully in grain and feed mills, clay processing plants, vegetable oil mills, fertilizer and rendering plants, and on harvester machinery, ditch trenching machinery, wood chip elevators, etc. In fact several California packers are using the cleats successfully for elevating olives and pickles from corrosive storage vat solutions.

One of the advantages of this unique cleat design is the ease of changing width and height of the cleats and the transfer of cleats to replacement belts.

Molded of long-life, high tensile neoprene, the cleats are resistant to oil, heat, mild acids, and weather conditions.

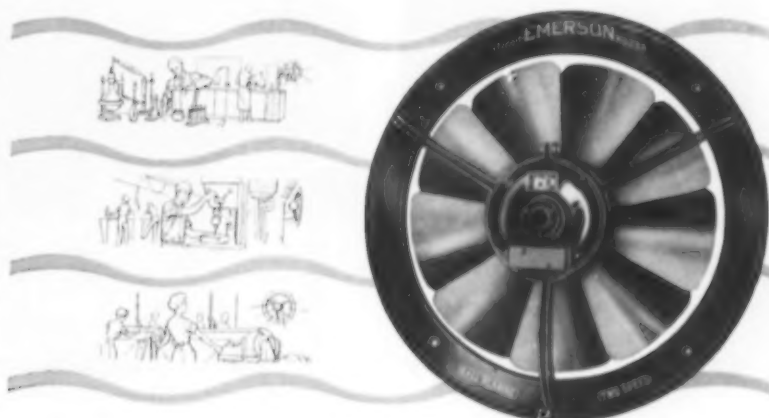
The cleats are available from stock in heights from $\frac{1}{2}$ " to 3"; in widths from $1\frac{1}{2}$ " to 24". Unusual widths, heights, and rib structure may be manufactured to specifications.

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Exhaust Fans

put new life in lazy air!

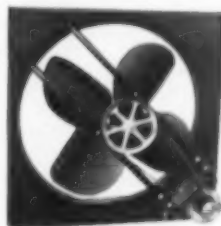


**Reduce fatigue...keep personnel alert
and efficient by removing excessive
heat, steam, dust and odors!**

These EMERSON-ELECTRIC exhaust fans actually cut down your labor costs by helping to keep personnel working at top efficiency. Heat, dust, odors and steam are removed from plants and laboratories . . . reducing fatigue and making work more pleasant.

EMERSON-ELECTRIC Direct-Drive ball-bearing Exhaust Fans have fully enclosed motors . . . self-cooling for continuous operation. Available in 12" single-speed and 16", 18", 24" and 30" two-speed models, capacities up to 6700 C.F.M. Three other models, 12", 16" and 18" with sleeve-bearing motors, have automatic outside shutters attached. Write for Bulletin No. 2004 today!

The Emerson Electric Mfg. Co., St. Louis 21, Mo.



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Belt-Drive, Ball-Bearing Exhaust Fans

Move large volumes of air quietly and economically. Deep-pitched balanced blades are driven by powerful Emerson-Electric lifetime motors. Five sizes—24" to 48"

Low Initial Cost!
Low Operating Cost!

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of heat
quickly • accurately
to 750°F

CHROMALOX Electric CIRCULATION HEATERS

Used for preheating oil—heating water—generating, superheating and drying steam—heating process kettles and tanks—heating Dowtherm, Arcelor, Prestone and similar heat transfer liquids—heating air, nitrogen and other gases.

Easy to install, operate and maintain, these compact, packaged heating units are automatic and self-contained—with built-in heating elements, heating chamber, thermostat, and insulation. Provide dependable round-the-clock operation. Ideal for converting steam or gas-heated equipment to automatic electric operation.

Let the Chromalox Sales-Engineering staff solve your heating problems . . . electrically.

Write today for your copy
of Bulletin 701

. . . to get complete information on Chromalox electric heat exchangers and their applications.

For information on complete line of Chromalox electric heaters and controls—request Catalog 50.

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Name

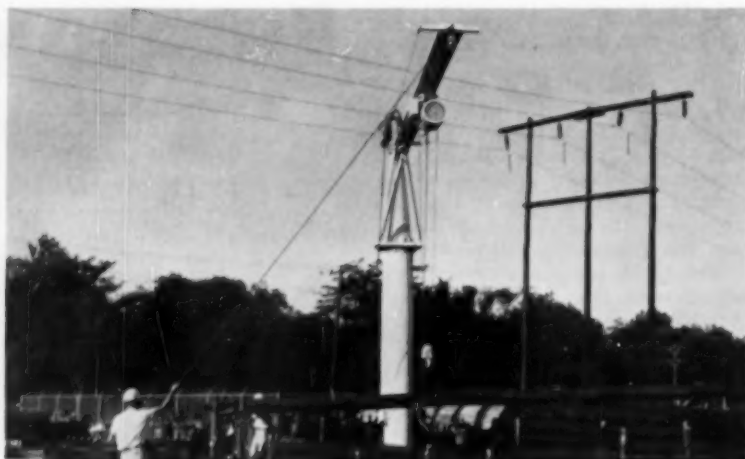
Company

Street

City Zone State

A-4479 A

SALES ENGINEERING REPRESENTATIVES—Atlanta 9, Ga.—C. B. Rogers and Associates, 1000 Peachtree St., N.E.; Charlotte 2, N. C.—Ransom, Wallace & Co., 116½ East Fourth St.; Dallas 26, Texas—L. R. Ward Co., 3009-11 Canton St.; Houston 3, Texas—L. R. Ward Co., 1814 Texas Ave.; Nashville 4, Tenn.—H. R. Miles and Associates, 2500 Franklin Road.



Power Rotated Jib Cranes

A-10

Electric hoists and power-rotated jib cranes, manufactured by R. G. LeTourneau Inc., 28411 S. MacArthur, Longview, Tex., give three dimensional, fraction-of-an-inch control of 6 to 15 ton loads. The all-welded steel construction unit promotes smooth starts and stops under full load with rotation either way at one-half rpm or less, and capacity load may be suspended anywhere on the 25 ft boom.

The crane is optionally equipped with the electric hoist matched to the job requirements. Its positive, mechanical brakes stop and hold

Reducing pole-handling time from 15 to 2 minutes is one of several benefits achieved by Mississippi Power & Light Co. through use of this LeTourneau jib crane with "inching control" hoist. Large transformers and reels of conductor in background, are also handled by jib crane arrangement.

capacity loads and the regenerative electric braking automatically controls lowering speed. Each safety controls 1½ times rated load.

The a-c motors power hoist, rotate boom and operate trolley, sustaining temporary low voltages without damage. They are instant reversing, varying speed type, either single or two speed control.



Zipper Style Tubing for Electrical Harness Assemblies

A-11

Time and labor costs are greatly reduced in the lacing and tying operation of electrical harness assemblies, through the use of a new zipper-style plastic tubing, "Zippertubing," manufactured by the W. A. Plum-

mer Mfg. Co., 752 S. San Pedro St., Los Angeles, Calif.

The simplicity and ease with which wiring can be encased with Zippertubing offers many applications in addition to the primary use as a substitute method for lacing and tying—such as wiring ducts, wire marking (in short lengths), and as a replaceable cable jacket to protect expensive custom cables from abrasive wear.

The zipper pull-tab used to close Zippertubing is detachable, and the tubing may be "unzipped" and reused, or permanently sealed with a sealer provided by the manufacturer. When sealed, Zippertubing will withstand a linear strength-test of 30 lb per inch. Available in nine colors, including black and clear plastic, Zippertubing is made of polyvinylchloride plastics. ID's are from ¼" to 4¼" in increments of ¼". Wall thickness, .020" and .040". Available in continuous lengths from 20 to 1,000 feet.

Equipment, Supplies & Methods (Cont'd)

Spark Proofing Kit for Industrial Trucks

A-12 Lamson Mobilift Corporation, Portland, Oregon has announced a new electrical spark proofing kit for each of the full line of stand-up and sit-down models of industrial trucks.

The new spark proofing kit is for use on gasoline engines in industrial trucks that are operated in areas where semi-hazardous fumes or elements are present. It shields the electrical system to eliminate the possibility of any electrical sparks being exposed to inflammable fumes. The kit, which is only factory installed, consists of a totally inclosed and shielded distributor, a shielded ignition coil and sealed Romex cables which inclose all high voltage ignition wires. The generator used in conjunction with the spark proofing kit is the standard generator to which protective shields are added. They inclose the air vents to prevent foreign material from entering the generator and creating sparks.

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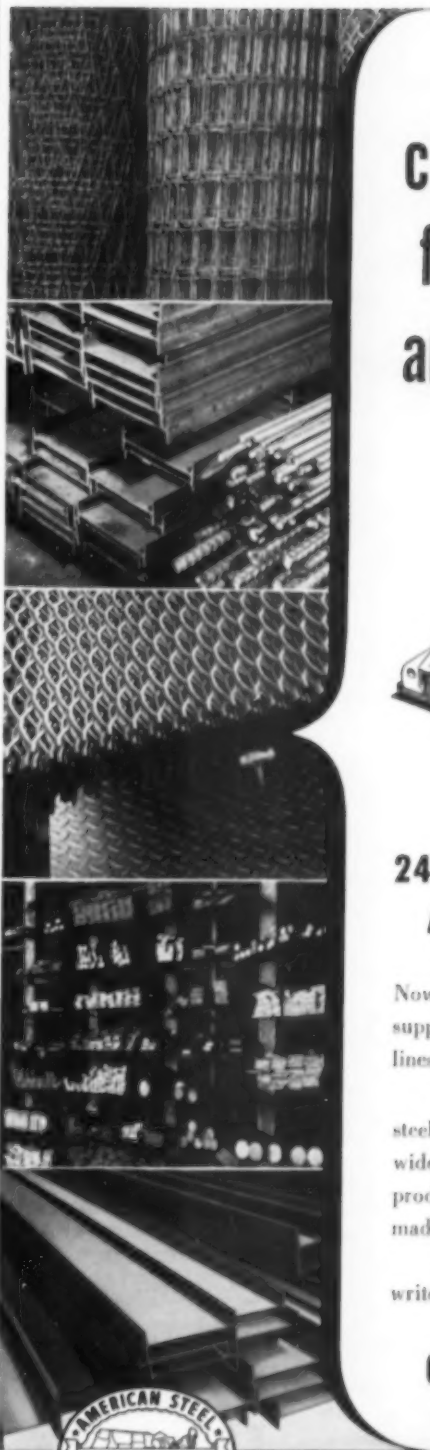
Mechanical Seal

A-13 A new mechanical seal, designed for high pressure boiler feed and other high temperature water services, has been developed by **Crane Packing Co.**, Morton Grove, Ill.

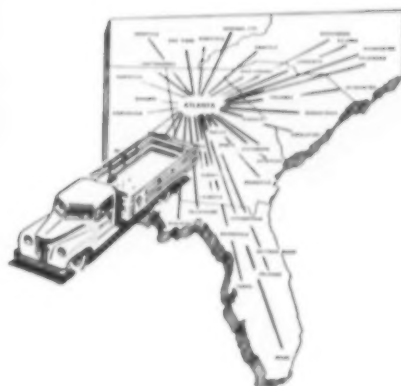
Once installed, the seal needs no further attention and replacement of expensive sleeves is eliminated. Loss of valuable feed water is prevented, since there is no leakage.

Long seal life is obtained through the use of a special closed circulating system. This engineered system provides cool water in sealing chamber assuring best seal performance.

The new seal comes fully engineered for the particular operation, including adaptation to pump design and piping arrangement. Plans are furnished. All necessary recommendations are supplied and heat exchanger size is specified. This provides a complete package that can be easily installed without major stuffing box alteration.



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Equipment, Supplies & Methods (Continued)



Fast Setting Cement

A-14 A new pourable cement that is reputed to set anchor bolts in 10 minutes or less is announced by **The Monroe Company, Inc.**, 10703 Quebec Ave., Cleveland 6, Ohio.

Known as Evr-Tite, the powder mixes readily with water to form a semi-fluid, easily-poured compound. When applied around an anchor bolt, it attaches itself to the bolt surface and fills all sections of the hole. Then, in 10 minutes, it is said to set with a minimum of shrinkage or "pulling away" from either bolt or hole.

Anchor bolts cemented with Evr-Tite can be drawn tight and light equipment put in operation within a half hour. For heavy vibrating machinery, Evr-Tite achieves high impact strength in less than one hour. It is recommended for securing anchor bolts in the fastening of pipe flanges, hand rails, partitions, stadium and theater seats, parking stanchions, etc. and is also suitable for repairing shallow holes in concrete floors.

Centrifugal Pumps

A-15 Ideal units for air conditioning, booster, condensate and other services are close-coupled centrifugal pumps, developed by **Goulds Pumps**, Seneca Falls, N. Y.

Since the motor and pump are a single complete unit, installation is quick and inexpensive. Simply

bolt the unit down, connect the piping and power and the pump is ready to use.

Once the pump is primed, the mechanical seal is fully protected from running dry. The seal prevents leakage, does not bind the shaft or require any adjustment or periodic maintenance. Discharge may be located in any one of eight positions, with drain, vent and priming openings provided. The balanced impeller is the only moving part. Because the casing is vertically split, inspection and maintenance may be made without disturbing piping connections.

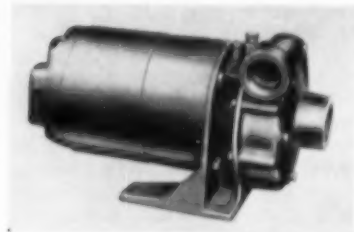
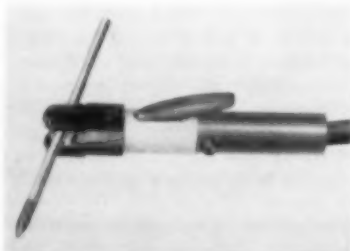


Fig. 3642 is available in 1" and 1 1/4" sizes with motors from 1/4 hp to 2 hp and capacities up to 100 gpm. Fig. 3643 is available in 1 1/2" and 2 1/4" sizes with 3 hp to 7 1/2 hp motors for capacities up to 350 gpm.

Specifications and performance curves are given in Bulletin 624.

Cutting & Gouging Torch

A-16 A completely redesigned Arcair Model H-3 torch, shorter and more compact than the G-3 model, has been introduced by **Arcair Company**, 419 S. Mt. Pleasant St., Lancaster, Ohio.



Completely insulated, the new unit is especially designed for hard-to-get-at places. Design features in-

clude a rotating head and concentric cable, heat and impact resistant moulded plastic insulators which lengthen insulator life up to four times, and a new push-button air valve that is completely insulated and doesn't need to be held down.

As with all models of the patented Arcair torch, the new H-3 uses only an electric arc and compressed air, and cuts, gouges, grooves or bevels any metal quickly and cleanly. The torch is simple to operate with no special skill needed, and has applications throughout all industries.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Wrench Chain

A-17 Morse Chain Company, Ithaca, N. Y. has added WC-522 Wrench Chain to its line of standard industrial products. The new chain is primarily for chain wrenches and vises but may also be used on any application where strength in tension, flexibility and quick, easy changes in chain wrap are necessary. Extended pins on both sides, each pitch, provide this quick, positive locking action. The natural flexibility of the chain permits it to hold any shaped material firmly without scratching or marring the surface.



WC-522 Wrench Chain is $\frac{3}{4}$ in. pitch; width over plates is .330 in.; and pin diameter is .200 in. Average ultimate strength is 7,400 lb.

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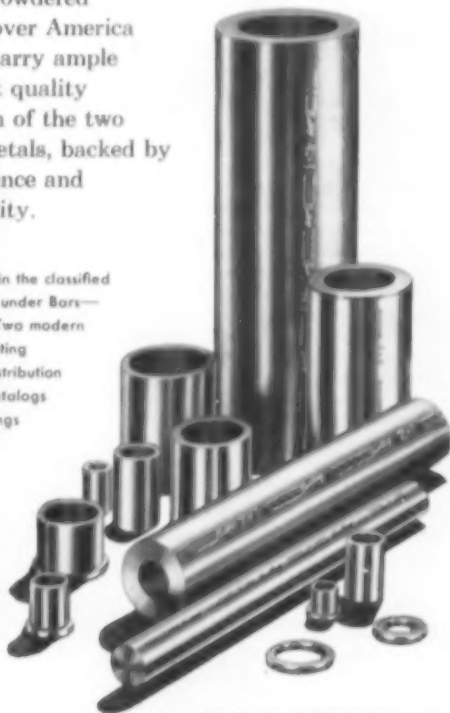
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IN A MATTER OF MINUTES—at any time—wherever you are—you can get a few or thousands of completely finished Stock Bearings and Bars made of Bunting Cast Bronze or Bunting Sintered Powdered Oil-filled Bronze. All over America Bunting distributors carry ample stocks of these highest quality products made in both of the two universally popular metals, backed by Bunting's long experience and established responsibility.

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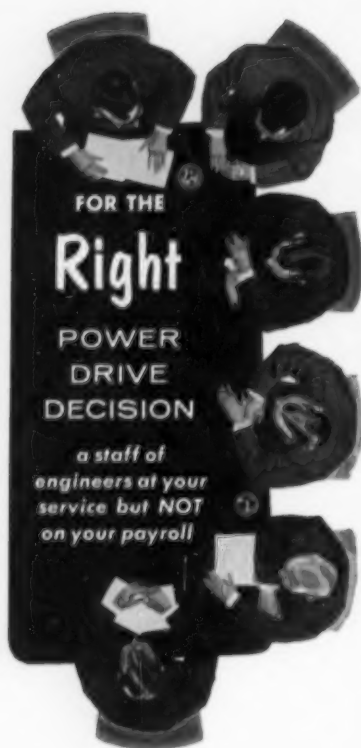
All Bunting Sintered Bronze Bars are machined to size on OD for quick and true chucking; the size is stamped the full length of the bar. Both are exclusive Bunting features.



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News for the South & Southwest (Continued)

(Starts Page 10)



Robert Rector, Walter Roberson, James Johnson & M. O. Rowe

New Sales Personnel for Holan Corp. of Georgia

Three new men, including a vice president in charge of sales, have been appointed to the **Holan Corporation of Georgia**, Griffin, Ga., manufacturers of hydraulic jacks, derricks, towers, ladders, etc.

Robert R. Rector, the new sales vice president, comes to Holan from McCabe-Powers Auto Body Company where he was a southern sales representative for six years. He was formerly associated with American Coach & Body in Cleveland, Ohio.

Walter G. Roberson, one of the two new sales representatives, for-

merly worked for Murphy Body Works, Wilson, N. C. He will serve Holan customers in **Georgia, Tennessee and Arkansas.**

James Johnson, a McCabe-Powers field representative in Illinois and Wisconsin for the past two years, will serve **Florida, Alabama and Mississippi.**

M. O. "Bud" Rowe, with headquarters in Dallas, Texas, continues to serve Holan customers in **Texas, Louisiana and Oklahoma.**

J. Howard Holan is President and **Victor H. Warner**, Vice President and National Director of Sales of the Holan Corporation, with headquarters in Cleveland, Ohio.



Kentuckian Wins Shipping Container Award

To the victor, **Donald W. Everett** (center) of the **Cochran Foil Co., Louisville, Ky.**, goes congratulations from **L. S. Beale** (left), secretary of the Wirebound Box Manufacturers Association, and **John W. McRey-**

nolds, national president of the Society of Industrial Packaging and Materials Handling Engineers, for his "Best of Show" entry in the National Protective Packaging and Materials Handling Competition re-

cently sponsored by SIPMHE in St. Louis.

This year's "Best of Show" container, which won over 150 other entries that included shipping containers of all types, is a wirebound box 33 1/4 by 46 1/2 by 31 1/2 inches containing a multiple pack of rolls of aluminum foil. The prize-winner was packed with six 300-pound rolls of foil.

Everett declared on his entry blank that adoption of the wirebound box simplified difficult handling and unloading problems, eliminated complaints of damage to foil during shipment, and brought about packing-for-shipment savings of 50%.

The prize-winning package consists of sectional wooden ends notched for either six or eight rolls of foil and held secure in channels formed by twin end cleats of the wirebound outer container. A mandrel places the rolls of foil so the ends of their cores rest in the notches. When one layer is in place on the notches of the bottom section of the wooden end, another section is placed in position and the second layer of rolls is placed, after which the top wooden section is placed in position and the wirebound container is closed by folding the top shut and securing it with wire-loop fasteners for shipment.

CVNPA—Nuclear Reactor

Four power companies serving the Carolinas and Virginia joined forces today to "design, develop, fabricate, construct and operate a nuclear power reactor or reactors."

The companies are **Carolina Power & Light, Duke Power, South Carolina Electric & Gas** and **Virginia Electric & Power**. They chartered a non-profit corporation called "**Carolinas Virginia Nuclear Power Associates, Inc.**"

Incorporators are L. V. Sutton, president of Carolina Power & Light; Norman A. Cocke, president of Duke Power; S. C. McMeekin, president of S. C. Electric & Gas; and T. Justin Moore, chairman of the executive committee and general counsel for Virginia Electric & Power.

They met in Charlotte and agreed on final details of the charter, which was filed with the Secretary of State at Raleigh. They stated that matters such as location, type of reactor, size and cost will depend on findings of consulting engineers experienced in

the field of nuclear reactors adaptable to generating electricity.

The Carolinas Virginia Nuclear Power Associates will work closely with the Atomic Energy Commission, other agencies and particularly with manufacturers and other companies interested primarily in atomic power reactors.

Activities of the individual companies toward putting the atom to work for power consumers have been accelerated since the Atomic Energy Act was amended to permit greater participation by private companies.

Carolina Power & Light and Duke Power obtained "access permits" from the Atomic Energy Commission so their engineers could share in the information available on power reactors. Both companies assigned personnel to nuclear short courses — conducted by N. C. State College physicists for CP&L classes and by Duke University for Duke Power people.

Earlier this year, the four companies organized an "Information Exchange Center" through which they funneled ideas on nuclear energy.

Representatives of all four companies participated in a work conference which presented a nuclear power recommendation to the recent Southern Governors' Conference at White Sulphur Springs, W. Va.

Cambar—Southeast

The **Cameron & Barkley Company** has been appointed exclusive distributor for **Homestead Valves** in **South Carolina, Florida** and **eastern Georgia** and for **Blackhawk Mfg. Co.** of Milwaukee, Wis.

Immediate service and delivery will be provided from Cameron & Barkley's six branches at Charleston, S. C., Savannah, Ga., Jacksonville, Orlando, Tampa and Miami, Fla. for Homestead's quality line of cam-sealed plug valves, lever-sealed plug valves, boiler blow-off valves, lubricated plug valves, hydraulic operating valves and radiant heating valves and for Blackhawk's quality line of hydraulic Port-Power equipment.

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ROANOKE	J. J. Bower	Roanoke 6-3474
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McKEES ROCKS, PA. (Pittsburgh District) Federal 1-7750

News for the South & Southwest (Continued)



Expanded Pipe Fabrication Facilities—Houston

One of the largest pipe fabricating operations in the country was created when **Houston Pipe & Steel, Inc.** joined forces with the **Flori Pipe Co.** of St. Louis as a combined operation of their parent company, the **Sparton Corporation** of Jackson, Michigan (formerly the **Sparks Withington Corporation**).

The **Flori Pipe Company** and **Houston Pipe and Steel Inc.** will function with a single administration head with unified sales and quality control staffs located at the St. Louis headquarters.

The Houston operation is conducted on an eight acre plant site housing five buildings. The main shop,

550 ft long, has an operating floor space of 50,000 sq ft. There is an additional shop with 12,000 sq ft devoted to production and a 4,000 sq ft warehouse.

The Houston plant houses the very latest in pipe fabricating equipment and tools assuring fast, accurate fabrication and delivery. Both shops as well as the pipe yard, are equipped with overhead electric cranes. The mechanics' stalls are equipped with swinging booms with three ton capacity. There are three level beds for squaring and final inspection; the largest measures 16 by 32 ft.

The Houston shop can handle a maximum plate thickness of 3-in. with diameters of 96-in. and length of 65 ft.

Houston Pipe & Steel employs 150 highly skilled technicians, engineers, supervisors and executive personnel. Sixty-three qualified welders give top quality work on carbon steel, chrome, stainless steel, Monel, Hastelloy and aluminum.

Connors—Ala. & W. Va.

Promotions for six key men of the **Connors Steel Division of H. K. Porter Company, Inc.**, have been announced by B. C. Blake, vice president and general manager of the Division. Connors Steel Division operates the Connors Works at Birmingham and the West Virginia Works at Huntington, West Virginia.

The West Virginia Works was formerly the West Virginia Steel & Manufacturing Company, a recent acquisition of the Porter Company.

Promoted to Manager of Connors Works is **James B. Reeves** who has occupied the position of Manager of Operations.

Elevated to General Manager of Sales for both works is **H. T. Montgomery** who has been General Sales Manager for the Connors Works.

J. Shiers Jones becomes Manager of Construction Materials for the West Virginia as well as Connors Works.

Richard J. Silver moves up from Assistant Manager of Merchant Products to Manager of Sales for the Connors Works.

J. T. Black now becomes General Superintendent of Connors Works. He was formerly the Assistant General Superintendent of Connors.

At the West Virginia Works **John J. Durkin** becomes Manager, **Borge Rosing** is Manager of Sales, and **Elmer Milby** moves up as General Superintendent.

1 TO
600 H.P.
A.C.



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Carpenter Steel—Southwest

A new mill-branch warehouse and office has been opened in Houston, Tex., by **The Carpenter Steel Company** to help meet the growing need for specialty steels in the Southwest.

Purpose of the new installation is to provide prompt sales and technical service to users of tool, stainless and alloy steels in **Texas, Louisiana, Mississippi** and the **Mobile, Ala., area**.

It is completely equipped, stocked and staffed to offer every service necessary on the entire range of Carpenter steels. **Charles E. Miller**, recently appointed Houston branch manager, will be in charge of the warehouse. He will be assisted by **John D. Wilson**, sales representative. The warehouse operates under the jurisdiction of **W. J. Ervin**, Carpenter district manager headquartered in Indianapolis, Ind.

FUTURE EVENTS of Engineering Interest

Jan. 23-25: Twelfth Annual Symposium on Instrumentation for the Process Industries, Texas A & M College, College Station, Texas. Designed to lead to an improved understanding of the principles and practice of instrumentation as applied to industries having continuous processes. Material to be on a practical engineering level with the talks directed toward all engineers whose work requires knowledge of industrial instrumentation — instrument, design, process and operating engineers. Dr. C. D. Holland, Dept. of Chemical Engr., Texas A & M College, College Sta., Tex.

Jan. 28-31: Plant Maintenance & Engineering Show, Public Auditorium, Cleveland, Ohio. 400 companies to participate in the show, displaying 5,000 pieces of equipment and accessory products in 278 categories. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Feb. 3-5: 26th Annual Mid-Winter Conference, Public Utility Buyers' Group, **National Association of Purchasing Agents**, The Brown Hotel, Louisville, Ky. L. Glen Wiseley, Chairman, Public Utility Buyers' Group, National Association of Purchasing Agents, Michigan Consolidated Gas Co., 415 Clifford St., Detroit 26, Mich.

Feb. 25-Mar. 1: 13th International Heating & Air-Conditioning Ex-

A-C—Washington, D. C.

O. V. Tally, director of industrial sales of **Allis-Chalmers Industries Group** since 1954, has been appointed manager of the firm's Washington district.

In his new capacity, Tally will be in charge of all Washington operations for the company's Industries and Tractor groups.

Tally joined Allis-Chalmers in 1926 and served as a representative successively in the New York, Washington and Philadelphia districts. In 1943 he was named manager of the St. Louis district. In 1950 he became manager of the Midwest region with headquarters in Chicago and in 1954 director of industrial sales of the Industries Group.

R. N. Landreth, who has been manager of the Washington district since 1950, has been assigned to the Industries Group sales staff.

position, **American Society of Heating & Air-Conditioning Engineers**, International Amphitheatre, Chicago, Ill. **E. K. Stevens**, President, International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Mar. 3-5: Southern Safety Conference & Exposition, John Marshall Hotel, Richmond, Va. 14 Southern states provide exhibit of safety items and will give 14 sectional programs on specific safety subjects. **W. L. Groth**, Executive Director, Box 8927, Richmond 25, Va.

March 25-27: Silver Anniversary, American Society of Tool Engineers, Shamrock Hilton Hotel, Houston, Texas. Includes symposium on ceramic and plastic tooling, technical papers, and panels. **L. S. Fletcher**, 10700 Puritan Ave., Detroit 38, Michigan.

Apr. 10-12: National Nuclear Instrumentation Conference, Instrument Society of America, Atlanta, Georgia. Sessions on instrumentation of nuclear power plants, several types of reactors, manufacture of nuclear fuels, unclassified military applications, radiation measurement, and application of nuclear instruments to industrial requirements. **Herbert Kindler**, ISA, 313 Sixth Ave., Pittsburgh, Pa.

May 20-23: 29th Annual Conference & Exhibit, Oil & Gas Power Division of The American Society of Mechanical Engineers, Kentucky Hotel, Louisville, Kentucky. **ASME**, Twenty-Nine West Thirtieth St., New York 18, N. Y.

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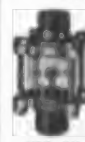


FIG. 29
Cylinder with
Impeller



FIG. 17-28
Cylinder



FIG. 215
Flanged



FIG. E-57
Double
Window



FIG. 212
Visibility
Welding
Neck or
Screw



FIG. E-611
Flapper

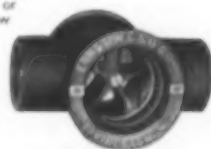


FIG. E-1810
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New Plants — Expansions

These highlights briefed from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, a monthly publication issued exclusively to SPI advertisers and their representatives through the South and Southwest.

- ✓ Manufacturing Plants
- ✓ Utility Plants
- ✓ Large Service Plants

South Atlantic

\$2,000,000 aeronautical instrument manufacturing plant to be constructed in April on a 73 acre tract in **Largo, Fla.** for **Air Associates, Inc.** . . . **NRC Metals Corp.** erecting a \$5,000,000 zirconium plant at **Pensacola, Fla.** . . . A factory for the manufacture of mobile homes will be erected in **Sarasota, Fla.** for **Ritzcraft Mobilehomes Inc.** . . . **West Palm Beach, Fla.** will be the home of **Pratt & Whitney Aircraft's** \$40,000,000 aircraft engine plant . . . Underway on a 95 acre site in **St. Petersburg, Fla.** is the \$4,000,000 plant for production of inertial guidance devices for manned aircraft and missiles for

Minneapolis-Honeywell Regulator Co.—to be completed in February.

Armco Drainage & Metal Products, Inc. erecting a \$500,000 fabricating plant on a 52 acre tract in **Atlanta, Ga.** . . . 72,000 sq ft warehouse to be constructed at **Savannah State Docks** in **Savannah, Ga.**

January completion scheduled for **Pneumafil Corp.'s** 12,600 sq ft engineering and research building in **Charlotte, N. C.** . . . \$2,000,000 chain saw factory for **Home-lite, Inc.** underway in **Gastonia, N. C.** . . . **Blue Bell Inc.** planning a \$500,000 office building for a \$125,000, 60,000 sq ft tract in **Greensboro, N. C.**

11,000 sq ft metal polishing plant being erected for **Metals Protection Co.** on a 25 acre tract in **Rock Hill, S. C.** . . . **Orefraction Minerals, Inc.** effecting plans for construction of a plant for grinding and processing mineral sands in **Andrews, S. C.** . . . \$350,000 natural gas expansion program underway in **Greenville, S. C.** for **Piedmont Natural Gas Co.** . . . Multi-million dollar textile finishing plant nearing completion in **Carlisle, S. C.** for **Cone Mills Co.**

\$2,000,000 table plant underway in **Bassett, Va.** for **Bassett Furniture Industries** with completion scheduled in October, 1957 . . . With completion anticipated in October, 1957 **General Electric Co.** is effecting plans for construction of a rectifier plant in **Lynchburg, Va.** . . . **Coleman Furniture Corp.** will add 77,000 sq ft to one building and 33,000 sq ft to another at its **Pulaski, Va.** works . . . \$10,000,000 research and development center underway on a 1,000 acre tract in **Rocky Mount, Va.** for **Thompson Products, Inc.** . . . Multi-million dollar plant for the manufacture of "Orlon" acrylic fiber planned for **E. I. du Pont Corp.** in **Waynesboro, Va.**

Spencer Mfg. Co. constructing a \$100,000, 22,000 sq ft addition in **Spencer, W. Va.** . . . Nearing completion is the pressure wood preserving plant in **Spencer, W. Va.** for **Mountain State Lumber Co., Inc.**

East South Central

Underway is the \$100,000 trucking warehouse, shop and office building for **West Brothers, Inc.** in **Birmingham, Ala.** . . . Sewerage disposal plant planned for **Clanton, Ala.** at a cost of \$250,000-\$300,000 . . . \$23,000,000 **Jackson Lock and Dam** underway on **Jackson-Tombigbee Waterway** near **Jackson, Ala.** . . . **Monroeville, Ala.** is getting a \$260,000 sewerage extension . . . Ex-



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tension and a new disposal plant—costing \$580,000—planned for **Prattville, Ala.** . . . Mid-1958 will see the completion of the expansion program for **Wolverine Tube Plant in Decatur, Ala.** . . . \$30,000,000 hydro-electric development on the Warrior River for **Alabama Power Co.** planned in **Montgomery, Ala.** . . . **Southern Natural Gas Co.** building \$2,855,350 of natural gas pipeline in **Birmingham, Ala.**

Early 1957 will see initial production at the \$1,000,000 **Misceramic Tile Co.** plant at **Brookhaven, Miss.** . . . An annual turnout of 30,000 tons of finished steel will begin in May at **Flowood, Miss.** at the multi-million dollar **Mississippi Steel Corp.**'s new mill . . . \$10,000,000 refinery for **Pontiac Eastern Corp.** underway in **Lamar County, Miss.** with operations expected to begin in June.

50,000 sq ft warehouse extension underway for **E. I. du Pont Co.**'s **Chattanooga, Tenn.** Nylon Plant . . . \$317,000 building planned in **Memphis, Tenn.** for **Hohenberg Brothers Cotton Co.** . . . Plans are being laid for a \$350,000 poultry diagnostic laboratory in **Nashville, Tenn.**, according to the **State Agriculture Dept.** . . . \$500,000 trucking terminal to be built in **Whitehaven, Tenn.** . . . **E. I. du Pont Co.** will expand its plant in **Woodstock, Tenn.**—doubling its capacity to manufacture sodium.

West South Central

Standard Registry Co. will erect a \$3,000,000 factory on a 40 acre tract in **Fayetteville, Ark.** . . . 120,000 sq ft box factory to be erected in **Ft. Smith, Ark.** for **Container Corp.**

\$325,000 glove plant underway in **Haynesville, La.** for **Edmont Mfg. Co.** . . . \$2,000,000 sewerage project being considered for **Westwego, La.**

Construction underway in **Muskogee, Okla.** on the \$1,500,000 **Container Corp.** plant which is expected to be completed by March, 1957.

\$2,000,000 construction planned in **Amarillo, Tex.** for **Pantex Ordnance Plant** . . . Air Reduction Sales Co. is underway on a \$600,000 expansion project for its **Corpus Christi, Tex.** plant . . . Multi-million dollar polyol production unit planned for **Cehm Cel Plant of Celanese Chemical Div.** in **Bishop, Tex.** . . . **Johns-Manville Corp.** to construct an asbestos pipe plant on a 469 acre tract in **Denison, Tex.** at a cost of \$8,000,000-\$10,000,000 . . . Being planned in **El Paso, Tex.** is a \$100,000 expansion project for **Atlas Building Products Co.** . . . 36,000 sq ft glass plant costing \$350,000 planned in **Ft. Worth, Tex.** for **Binswanger Co.** . . . **Texsteam Corp.** of **Houston, Tex.** planning a \$1,000,000 manufacturing plant containing 60,000 sq ft of floor space . . . \$500,000, 24,000 sq ft plant planned by **Frito Co.** for **Houston, Tex.** . . . \$5,500,000 expansion and new plant project anticipated for **Jefferson Lake Sulphur Co.** on the **Houston Ship Channel** in **Houston, Tex.** . . . **International Furniture Co.** is doubling its **Jacksonville, Tex.** plant facilities at a cost of \$245,000 . . . \$1,000,000 manufacturing plant underway for **Garrett Oil Tools, Inc.** on a 40 acre site in **Longview, Tex.** . . . January sees the beginning of **Odessa Styrene Co.**'s styrene plant in **Odessa, Tex.** which will be capable of producing 35,000,000 lb annually when it is completed in early 1958 . . . \$300,000 **Flintkote Gypsum Plant** in **Sweetwater, Tex.** will be completed in the latter part of 1957.



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Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

New Catalogs for the Plant Engineer

FOR FREE INFORMATION—Circle code number on page 17 or 18

M-1—Power-Rotated Jib Crane — Bulletin describes all-electric 360° revolving jib cranes in 6, 7½, 10 and 15 ton capacities which provide power handling for 1,936 sq ft of floor space. All-welded steel construction; 25 ft boom; dual braking system; fraction-of-an-inch control. — R. G. LeTOURNEAU, INC., 28411 South MacArthur, Longview, Tex.

M-2—Metal Fabrications — 4 page bulletin shows how company custom-fabricates tanks, pressure vessels, air receivers, etc., for chemical, petrochemical, pulp and paper and other process industries. Summary of metals, plate, diameters, weight limitations, welding, code & shipping. — DELTA TANK MANUFACTURING CO., INC., Box 1469, Baton Rouge, La.

M-3 — Steel Tank Maintenance — Pamphlet "Cleaning and Painting All Types of Repair Service" gives requirements for a complete maintenance job at the lowest possible cost for water tanks and other types of steel structures. — STEEL AND TANK SERVICE CO., 118 West 24th St., Charlotte, N. C. or 829 Clayton Ave., Nashville, Tenn.

M-4—Heat Transfer Medium—Bulletin No. 200 describes Thermon which offers low cost, excellent heat transfer, dependability, long service life, use in wide range of temperatures, no jacket pluggages or product contamination, good mechanical and thermal shock resistance, rapid delivery, adaptability, longer life from electric heaters and easy equipment maintenance. — THERMON MANUFACTURING COMPANY, 1017 Rosine Street, Box 1961, Houston, Tex.

M-5—Liquid Separator Filter—Catalog describes Fram Liquid Separator filters space-saver units, scientific method of removing water from liquid hydrocarbons by filtration. Units engineered for easy installation and maintenance and are compactly designed for a wide variety of applications — up to 69 gpm. — WARNER LEWIS COMPANY, Box 3096, Tulsa, Okla.

M-6—Arc Welding Aluminum—Folder TIS 2891, "Arc Weld Aluminum As Easily As Mild Steel," describes "Low Amp" Eutectrode 2101 DC, the new electrode for aluminum featuring an extruded coating. Points out the advantages of an extruded coating over hand-dipped coatings on aluminum electrodes and gives case studies show-

ing the joint strength, corrosion resistance and high quality dense welding properties of the electrode. — EUTECTIC WELDING ALLOYS CORP., Flushing 58, N. Y.

M-7—Sheave Specification Guide—16 page illustrated Catalog Section 83-A 1056 lists 739 different stock sizes of quick-detachable sheaves from 3.4 inches in diameter, weighing two pounds to a 6 ft sheave weighing 1½ tons. All sheaves listed are fully interchangeable with sheaves produced by other QD manufacturers. Gives dimension and weights of all listings and provides instruction for both standard and alternate mounting of sheaves on shafts. — FORT WORTH STEEL & MACHINERY COMPANY, P. O. Box 1038, Fort Worth, Texas.

M-8—Why Hot Spray?—This booklet lists the major benefits of hot spray applications of finishing materials and explains each benefit in detail, giving case histories as illustrations. Contains Question & Answer section concerning questions most frequently asked about hot spray. Includes photographs and drawings. — SPEE-FLO COMPANY, 720 Polk, Houston 2, Tex.

M-9—Abrasive Cut-Off Saws — 44 page book explains various types of abrasive cut-off saws — portable combination cut-off and deburring chop saw, Wallace Modular cut-off saw with a capacity 5" standard pipe, swing type for high production work, and the rotating cut-off saw having 12" pipe capacity. Also includes a portable hacksaw and bandsaw. Well illustrated. — WALLACE SUPPLIES MFG. CO., 1300 Diversey Parkway, Chicago 14, Ill.

M-10—Steam Jet Vacuum Pumps—Bulletin 5H3 describes the company's three, four and five stage steam jet vacuum pumps and vacuum boosters. Includes condensing and non-condensing types and covers applications, features of the apparatus, materials of construction, and operation. Gives sizes and dimensions in tabular form along with performance characteristics for 3-stage units. — SCHUTTE & KOERTING COMPANY, Cornwells Heights, Bucks Co., Pa.

M-11—Optical Parts for Industry—16 page Catalog L-117 gives latest information on a wide variety of special lenses, prisms, and reflectors for industrial use as well as information on ground glass, heat

absorbing glass, retardation plates, and the company's precision glass engraving and optical coating services. — BAUSCH & LOMB OPTICAL CO., 635 St. Paul St., Rochester, N. Y.

M-12—L P-Gas Carburetion—Folder describes the advantages of L P-Gas Carburetion and contains pictures of the products, including regulators, carburetors, adapters, solenoid valves, adapters and factory built assemblies for the conversion of fork lift trucks to L P-Gas. — BEAM PRODUCTS MFG. CO., 3040 Rosslyn St., Los Angeles 65, Calif.

M-13—Diaphragm Control Valve — Bulletin gives detailed information on Type 30 Diaphragm Control Valve's available sizes, specifications and dimensions, pressure and temperature ratings, capacities, optional accessories and other data. — A. W. CASH CO., P. O. Box 551, Decatur, Ill.

M-14—Oxide Cutting Tools — Chart of recommended speeds and feeds for use in turning various materials with oxide cutting tools. — Diamonite Products Division of UNITED STATES CERAMIC TILE CO., Canton 2, Ohio.

M-15—Coal Dust Control—Brochure describes specially engineered systems for controlling coal dust in industrial and utility power plants. Various handling points of these Chem-Jet systems are defined and illustrated with explanations of how the system suppresses dust at its source. Defines additional uses for the compound. Describes a specialized unit for controlling low micron dust and fumes at the breaker buildings and coal bunkers. — JOHNSON-MARCH CORPORATION, 1724 Chestnut St., Philadelphia 3, Pa.

M-16—Nondestructive Test Systems — 16 page booklet includes some of the basics of magnetic particle inspection, some of the variations to suit many different needs, in finding and preventing cracks and other defects that are so often the cause of scrap, final rejection, high costs or failure in service. Examples of how various types of industries are putting nondestructive testing with Magnaflux-Magnaglo to profitable use with ease and at low cost. — MAGNAFLUX CORPORATION, 7300 West Lawrence Ave., Chicago 31, Illinois.

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Eggehof Engineers Holds Annual Meeting

Eggehof Engineers, Inc., serving Southern & Southwestern industry through offices in Houston, Dallas, Shreveport, San Antonio, Tulsa, Lubbock and New Orleans, recently held their annual meeting in Houston, Texas. Training sessions, combined with a sales meeting are held annually with manufacturers' personnel.

Those attending included (front row): From Dallas—Harper Young, Henry Eggehof; From Houston—R. G. Thomas, L. S. Andre, Ruth Callahan, Dalton Chapman, Billye Killen, Claude Cullinane, Sue Groh, Wilson Green, Bob Molnari, Charlene Onda, Will Molnari; From Lubbock—Melba Dawson, and C. E. Menefee.

(Back row) From New Orleans—Ernest Belmont, Ed Lafaye, Henry Turner; From Shreveport—Willie Cunningham, George Lakas, A. L. Jones; From San Antonio—Minna Perry, J. H. Powell; From Tulsa—Adele Boesche and Cliff Lindsey. Others are D. H. Van Vleck of Cuno Engineering, and Fred Maltby, Ralph Stotsenberg, Jack Fairbanks and J. W. Philippi of Fielden Instrument Div. of Robertshaw-Fulton Controls.

Eggehof Engineers, Inc., represent the following leading manufacturers: American District Steam Company, Clark Mfg. Co., Cuno Engineering Corp., Fulton Sylphon and Fielden Instrument Divisions of Robertshaw-Fulton Controls Co., Fred H. Schaub Engineering Co., Titusville Iron Works Co., and the John Zink Co.

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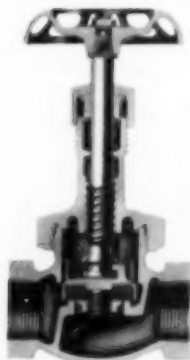
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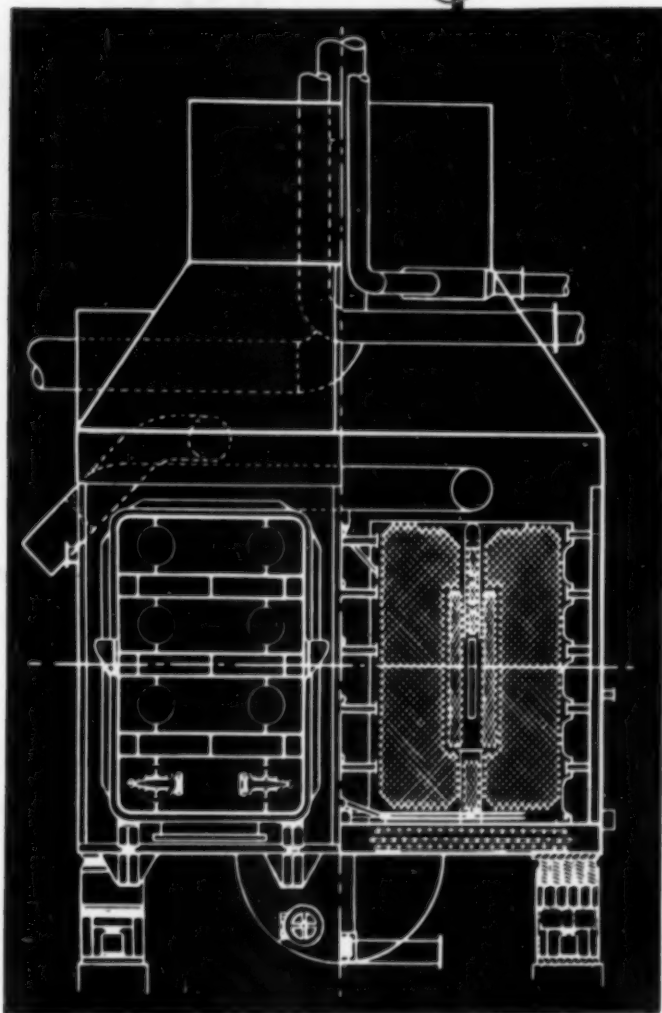


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